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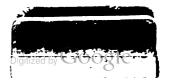






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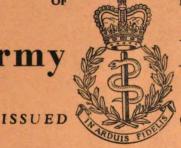


Journal

OF

THE

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Medical Corps

OUARTERLY

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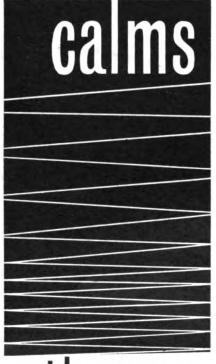
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REPORT OF THE ROYAL SANITARY COMMISSION (1858)*

BY

S. ROSENBAUM, M.A.

Army Medical Statistics Department

THE publication of this great Report just over one hundred years ago set the seal on some brilliant pioneering work in Army medical statistics by amateurs, that is investigators who were not originally employed for this express purpose. Sir Alexander Tulloch in his evidence to the Commission related how he had commenced as an amateur and eventually became a public functionary in the War Office. After the Commission reported, a statistics branch was set up on a proper basis, and the present statistics branch of the Army Medical Department may claim to be in a line of descent from this, although perhaps not a direct line, for there have been vicissitudes in the interval with periods of neglect and retrenchment, and the present set-up derives from the Directorate of Medical (Statistical) Research that was formed during the war of 1939–1945.

The threads go back to 1816, when the Director-General, Sir James McGrigor, established returns and reports of sickness in the Army. However, the reports of the medical officers were not attended to (by the Ordnance Department) in spite of numerous representations, principally on account of the expense; neither were the records analysed, on the same ground.

Tulloch, who in 1834 was employed on the Recruiting Service, was led from an interest in pensions to a mortality inquiry, in the course of which he first met Henry Marshall, of the Army Medical Service, and published two articles in the *United Service Magazine* of 1835. He then became, at the instance of Earl Grey, Secretary-at-War, associated with Marshall in drawing up, from the

[•] Report of the Commissioners appointed to inquire into the Regulations affecting the sanitary condition of the Army, the organisation of military hospitals, and the treatment of the sick and wounded. Presented to both Houses of Parliament by Command of Her Majesty. H.M.S.O. 1858.

records instituted in 1816, a report to be presented to Parliament. When Marshall retired in 1836, Tulloch was joined by T. Graham Balfour, and the two were long associated; Balfour became Secretary to the Royal Sanitary Commission, and eventually first head of the statistical branch, reaching the rank of Surgeon-General.

The first of a series of reports, that on the West Indies, was published in 1838, and, as the Commissioners said, the benefit accruing to the Army from them was very great. They resulted in the move of troops from unhealthy districts, and without doubt prevented a large amount of sickness and consequent mortality. The figures for the West Indies given by Tulloch in the Minutes of Evidence showed a reduction in mortality from 85 per 1,000 in the years 1817–1838 to 60 per 1,000 in the years 1838–1853. This is still a vast mortality.

Thus did McGrigor's returns receive their accolade, and as put by the Commissioners in questioning Tulloch, no other person in this country except William Farr, of the Registrar-General's Office, had enjoyed the advantage of so great a range of observation. Farr, who was the leading vital statistician of his day, was drawn into the circle of friends campaigning for the reform of the Army Medical Service (and others) after the revelations of the Crimean War, and met Florence Nightingale first at dinner with the Tullochs. He had presumably known Tulloch for some time through the Statistical Society (later the Royal Statistical Society), and it is hardly coincidental that the Registrar-General's Office was set up in 1837, and the first report, for the year ending 30th June, 1838, published in 1839, the year after Tulloch and Balfour's report on the West Indies. The climate of opinion, both public and professiona was obviously favourable to such works.

Tulloch and Farr formed the committee, under the chairmanship of Herbert, set up to implement the recommendation of the Royal Commission for a statistical branch in the Army Medical Department. Florence Nightingale's was the spirit that forged the various weapons which lay to hand for reforming the Army Medical Service. Brought to white-heat by the experiences of the Crimean War, she never rested while the Royal Sanitary Commission was being set up, nor indeed later. She was herself no mean statistician, and thoroughly understood the importance of statistics to her cause.

Together with Sidney Herbert, or perhaps through him, as her biographers lead us to believe, she created the Royal Commission, conducted it (off-stage, the chairman was Herbert), and saw that its recommendations were implemented.

The biographies referred to are as follows. First, and the starting point for later studies, is Sir Edward Cook's (1913), *The Life of Florence Nightingale*, in two volumes published by Macmillan and Co., written soon after Miss Nightingale's death in 1910. An abridged and revised version by Rosalind Nash appeared in 1925.

Next came the brilliant cameo by Lytton Strachey in 1918, which usually appears in *Eminent Victorians*. (Quotations here are from the joint volume with *Queen Victoria*, published as *Five Victorians* in 1942 by the Reprint Society, by

arrangement with Chatto and Windus.) Most recent is the biography by Cecil Woodham-Smith (1950), published by Constable under the title *Florence Nightingale*, 1820-1910.

All the later writers acknowledge their debt, as they must, to Cook's *Life*, but the impressions gained of Florence Nightingale vary according to the author. Rosalind Nash goes so far as to accuse Lytton Strachey of writing a caricature. It certainly is a wonderful sketch, and on re-reading it I am struck by the truth achieved in its economy, and certainly by the vividness of such a compression as when he quotes Queen Victoria: "Such a head! I wish we had her at the War Office."

We will leave it to him to state pithily the situation revealed in the Crimea that made a Royal Commission the crying need. "Errors, follies, and vices on the part of individuals there doubtless were; but, in the general reckoning, they were of small account—insignificant symptoms of the deep disease of the body politic—the enormous calamity of administrative collapse."

The reforms had in fact long been needed, but the Crimea was a dramatic occasion, dramatically presented by the war correspondent of *The Times*, and with God's gift to a public cause—the person of Florence Nightingale. She needed to be, and was, far from being merely a ministering angel. In her angry letters to Herbert she was not sparing of criticism over her Augean stables and the obstacles to be cleared, so much so that Herbert was led to protest at her vehemence.

On returning home she followed up the suggestion for a Royal Commission made by J. H. Lefroy, scientific adviser at the War Office, and pressed it to a successful conclusion. The membership was more or less packed by her, and in the end only one was of a different persuasion, the Director-General Dr. Andrew Smith, who could hardly be left out. He eventually marred the unanimity of the Report by dissenting from some of its recommendations. (His presence was balanced by that of the next Director-General, Alexander, who succeeded him as the nominee of Miss Nightingale). Herbert was, of course, the chairman: "I could do nothing without him."

Her success in getting a Royal Commission approved was probably due to a widely felt need for some action, but the Secretary of State, Lord Panmure, was enlivened into setting the thing in train by the knowledge that Miss Nightingale would otherwise publish a report on her own account. This she was quite fitted to do, for indeed she did write a work Notes affecting the Health, Efficiency, and Hospital Administration of the British Army, which was privately printed, and part of which was incorporated in the Commission's Report. As the Commission got under way she worked tremendously hard on the evidence, and on coaching the principals, and in the end assisted Herbert in writing the Report the recommendations of which were similar to those of her private report. According to one source, she listed it as "one of my works."

The Commission, signed by Lord Panmure the Secretary of State for War on the 5th May, 1857, called upon Sidney Herbert and eight others to inquire into the organisation, government, and direction of the Army Medical Depart-

ment. Among other topics they were commanded to "report your opinion upon such returns or records as shall be kept by the medical officers of our Army, with a view to the preparation of a well digested and accurate body of military medical statistics."

Herbert had been Secretary of State at War when Florence Nightingale went out to Scutari, in fact it was he who asked her to go: a man she thought "of the quickest and most accurate perception I have ever known. Also he was the most sympathetic." The two were necessary to each other in this business, he the man of position, she the so-called Commander-in-Chief of the sanitary experts, the collector and collator of facts, directing tactics from behind the scenes.

As the Commissioners surveyed the field of inquiry, they found that a large amount of information existed in the reports of various earlier Commissions, and in the Statistical Reports on the sickness, mortality, and invaliding among the troops, presented to Parliament in 1838-9-40-41 and 53. (These were the Reports of Tulloch and Balfour.) In addition they examined 52 witnesses, including half the members of the Commission; the 53rd witness was Miss Nightingale, who communicated in writing.

One who had been bitterly opposed to the Crimea investigations was Sir John Hall, the Principal Medical Officer to the army in the East (the Crimea). His biography, prepared at the behest of his daughter by S. M. Mitra, appeared in 1911, the year after Florence Nightingale's death (*The Life and Letters of Sir John Hall*, Longmans, Green and Co.) and two years before that of Sir E. Cook, the father of all Nightingale biographies. This opposition was early perceived by Herbert to come from a resentment that his preparations were being shown up as inadequate. The later biographies give full play to criticism of his character, ranging from Strachey's "rough terrier of a man" to Woodham-Smith's "revengeful, powerful, a master of the confidential report." He was reputed to be a strict disciplinarian, who considered that troops should not be pampered, and when he was awarded the K.C.B., Miss Nightingale suggested that the letters stood for "Knight of the Crimean Burial-grounds." Yet their personal relations were apparently not unfriendly.

The position taken up by Sir John Hall, and he was not alone at that time, comes out quite clearly from his evidence to the Commission. The general tenor of the argument was that the spate of Commissions was unnecessary, that the remedies were known, and only the authority and finance were lacking. The particular Commission argued about had gone out to the Crimea in March 1855 as a result of the unease felt at home. In Sir John's examination he was asked whether this had a material effect on the sickness and mortality. "I do not think it affected them in any one particular instance; the result would have been the same if they had never gone there.—The sanitary commissioners claim credit for reducing the sickness at Scutari in June 1855, but the supply of sick from the Crimea had fallen off one half. In the March quarter when we sent down about 6,000 sick, out of those perhaps 250 died on the passage, marking the gravity of the disease; and in the following quarter, when they take credit for the army improving under their auspices, we sent down about 3,000 sick, and out of

those 19 died on the passage, but they had nothing to do with that; it was the character of the disease that had changed."

He added, "I do not say that you should not give proper attention to all sanitary matters."

In reply to Sir John Hall, Dr. John Sutherland, as spokesman for the Crimea commissioners, claimed no such credit: "We do attribute part of the diminished mortality in the hospitals to the very cause to which he appears desirous of attributing the whole." He then proceeded to build up a case in formidable style. First the facts, with sickening insistence. "The great hospitals at Scutari were magnificent buildings, when superficially looked at, but they were little better than pest-houses. . . . During three weeks ending 17th March, the date when our sanitary works began, 5,522 sick yielded a mortality of 93 per 1,000. After this date the outskirts of all the hospitals were cleansed and kept clean. All dead animals were immediately buried; peat charcoal was extensively used as a deodorizer for sewers, privies, and nuisances; the sewers were opened, and their contents removed; and the whole drainage was flushed out several times a day by our own inspector. . . . In four months he removed 5,114 hand carts of filth from the vicinity and from the sewers; he buried 35 carcases and flushed out the drains and latrines by the tanks 466 times, . . . Within the first three weeks of the improvements, the mortality in all the hospitals fell to one half of what it was during the three weeks before. . . . but part of the immense reduction in the mortality (by the end of 4 months) was due, as we have stated in our report, to the less severe character of the cases sent from the Crimea."

Then he proceeded to demolish Sir John Hall's argument against the necessity for a Commission. "Statements productive of no practical result may have been made. It is even possible that recommendations sufficient may have been put in writing, but it is perfectly certain that the hospitals were in the bad sanitary condition we have described. We had no authority to inquire what recommendations had been made, nor who had neglected them. We had simply to deal with the defects as we found them." Finally a contemptuous dismissal of this opponent of reform: "Sir John Hall has expressed an opinion contrary to ours in regard to the effect of these sanitary measures on the health of the troops. The time I hope has gone by when it is necessary to combat such opinions; measures of the same nature as those carried out in the Crimea have been incorporated in numerous acts of Parliament, and paid for by rate-payers who recognise their greater than money value."

Later, in giving evidence Sutherland was at pains to explain that his vehemence was directed solely to imperfections in the sanitary system, and not against the medical service. He knew that much of the trouble lay in the lack of power of the medical officers, and in a letter published in *The Times* spoke of suggestions coming from them which "were called 'doctors' crotchets' and thrown aside."

This was naturally the attitude of the men who were in office at the time, and it seems a just one. All were agreed that Army (and Navy) medical officers had taken the lead in knowledge of the external causes of disease. It was through

them to a great extent that sanitary measures had made such rapid advances in this country; yet the Army itself had not reaped the benefit. It was necessary, as the Director-General remarked, "for the government to be more liberal in the expenditure of money as to sanitary matters."

The expert witnesses who gave verbal evidence with a bearing on statistics were Sir Alexander Tulloch and Dr. William Farr. The former defined the object of statistics as the accumulation of facts from a long period, with deductions drawn from a broad basis in which all minor errors disappear. He informed the Commission that the Army suffered little from epidemic diseases (apart from fever), and agreed with the observation that in malarious countries the greater proportion of the sick came into hospital after being on night duty; the latter was apparently a matter of common observation. On the question of overcrowding in barracks he thought that this would encourage the spread of disease, apart from the ventilation being defective. Also when asked whether ophthalmia was produced by a bad atmosphere, he mentioned another possibility, the sameness of diet. He was thus using a proper caution in drawing conclusions from the facts that had been collected. Another interesting remark of his related to recruitment (in which he had personal experience): in the anxiety to get tall men, he said, not enough attention was paid to the capacity of the chest; thus slight young men were recruited who were "the very class most subject to consumption."

Farr was downright about the limitations in drawing up a nomenclature of diseases. "We were anxious not to multiply the forms of fever beyond the power of discrimination. A great number of practitioners could distinguish diseases with minute accuracy, but the whole of the practitioners of the country would be unable to do so." Therefore they threw several forms of fever together.

Speaking of mortality, he laid claim to London being the healthiest great city in the world. Soldiers compared unfavourably.

Most of Farr's contribution was in his tables and diagrams in the Appendix. though the latter should more properly be ascribed to Miss Nightingale. The two had, of course, thoroughly discussed the presentation of the evidence, and she sent him the proofs of the statistical section of her private report, which was later incorporated in the Commission's Report. Farr was much impressed, particularly with the diagrams, which were novel and arresting. They showed the deaths in military hospitals during the Crimean War and were in a circular form with months in each segment and incidence plotted radially. They were nicknamed "coxcombs" in her correspondence, from their shape and colours. Farr's comment on the Crimean calamity which they represented was that with the exception possibly of one or two of the mediaeval epidemics, no pestilence has been recorded which would give such a picture for eight consecutive months. The whole catastrophe was caused by the zymotic diseases, namely fevers. diarrhœa, cholera, dysentery, etc. Referring to the diagram, the mortality from wounds (other than killed in action) was in the small pink cone in the centre. The mortality from non-zymotic diseases was the small adjacent black patch.

"The irregular blue surface, like the tail of a portentous comet, shows the zymotic diseases, the pests and scourges of camps and armies now, as they were of cities and towns in the Middle Ages, before the dawn of sanitary knowledge."

And now there was the evidence of Florence Nightingale herself, presented in written form as question and answer. Occupying some 30 pages of the Blue Book, it was in effect a condensed summary of her private report (the Notes). The most telling part was naturally in relation to the Crimea, "We had, in the first seven months of the Crimean campaign, a mortality among the troops at the rate of 60 per cent per annum from disease alone—a rate of mortality which exceeds that of the great plague in the population of London. We had a mortality in the last five months of the war two-thirds only of what it is among our troops at home. Is this not the most complete experiment in army hygiene? We cannot try this experiment over again for the benefit of inquirers at home, like a chemical experiment. It must be brought forward as a historical example."

She was at great pains to show that her methods of calculation were valid, and that other methods were not. As an example of the indices she used there were 2,145 deaths among 10,843 cases treated, which she presented as a fatality rate (as it would be termed today) of 19.8 per cent. These same deaths occurred over a period of 123 days in a hospital population of 3,140 (at one time), representing an annual mortality rate of 203 per cent, an index which could be used as she said to show the comparative sanitary condition of the sick in different hospitals. Such an index would not be used in this context today, though the first one is unexceptionable.

In validating her own figures she even ventures on an algebraical explanation, offering a proof that the number of cases treated $(C) = \frac{A+D}{2}$ where A are admissions and D are discharges (including deaths). Defining F as the number already under treatment at the first, and L as the number remaining at the last she says that under certain assumptions

$$A+\frac{F}{2}-\frac{L}{2}=C$$
 and
$$D-\frac{F}{2}+\frac{L}{2}=C$$

whence by addition the result follows.

On the subject of other people's indices she is merciless. Dr. Hall had reported to Lord Raglan, the Commander-in-Chief, on 3rd April, 1855, that the general health of the army continued to improve steadily. "During the present week the admissions have been in the ratio of 3.93 per cent, and the deaths to strength 0.38 per cent." (Compared with 4.35 and 0.52 the previous week.)

Said Florence Nightingale: "This mere information is simply misleading to the authorities unless indeed, which is hardly likely, they are thoroughly au fait at statistical inquiries. The standard of comparison all over the civilised

world is the percentage per annum....0.52, 3.93 per cent look nothing. But multiply 3.9 by 52 = 2,028, in order to get the annual admissions per 1,000; and it will be found that the whole force will go twice through hospital in a year, at that rate.... Multiply 0.52 by 52 in the same way, and it will be found that the mortality is 270 per 1,000 per annum. In other words, that more than one-fourth of the whole population will perish in a year."

To sum up her methodology, "For the purposes of accurate comparison it is necessary to reduce all our facts

- (1) to unity of time,
- (2) to unity of strength, or numbers under observation."

She put the case for collecting the facts with her usual trenchancy. "Where half an army may melt away from zymotics alone, or be rendered inefficient just when its services are most wanted, not by wounds, but by disease, of how vital importance is it for the authorities to be furnished with such information?"

Here for example is what they revealed of the incidence of disease in January 1855.

			Admissions	Deaths
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The larger part, if not all, she said, of these deaths (two-thirds of all the deaths in the Force) could be ascribed to the scorbutic type of disease; for "scorbutic" read "bad food" etc., and you have the cause.

From here on, the evidence turned to stores and so on, with the same acrid style of denunciation. The ward furniture is listed as at 1st January, 1855.

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Candlesticks	none	Nightcaps	a few
Tin drinking cups	none	Slippers	none
Urinals (metal)	plenty	Knives and forks	none
Bed pans	some	Spoons	none
Close stools	plenty but frames	Flannel Shirts	none
	wanted	Socks, pairs	none
Tin pails for tea	none at present	Drawers, pairs	none
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Enormous quantities were supplied from private sources at her instance. She put down a cause of the difficulties to the fear of being called a "trouble-some fellow," which deterred some medical officers from making requisitions because they feared injury to their prospects. "This will be denied. But it is true for all that."

She had become an accepted authority both on the administration of hospitals—"the system of agglomerated regimental hospitals is no system at all," and on their design: "the cooking, etc., should be concentrated into one; while

human beings, sick or well, should be distributed." Organisation was her forte; it was what Lefroy had called for when he said that Lord Panmure could reform, but hated detail. She had in mind the chaos and confusion of early days at Scutari, when she said that a registrar was essential for a general hospital. She had in mind the essential need for knowing the extent of disease when she persisted in having a medical statistics branch set up. She used her own skill in statistics to cast scorn upon the existing methods: "I have carefully compared the statistics from six different official sources, and none of them agree. The great discrepancies in the several numbers shake confidence in their accuracy, and render it difficult to make any use of them for statistical purposes."

Her scathing commentary gave to Blue Books an unwonted publicity. It was one of the two legs on which stood the description of her as "The Passionate Statistician." The other was the enthusiasm for statistics already aroused in 1853; but the passion aroused by them was enough to shake a Government Department to its roots, whose power of passive resistance, declared her biographer, was unintelligible to outsiders.

"When I write civilly," wrote Miss Nightingale, "I have a civil answer, and nothing is done. When I write furiously, I have a rude letter—and something is done (not even then always, but only then)."

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The mortality by ages is shown as compared with the general civilian population.

Annual mortality per 1,000												
				Army at home	Civilian males							
20-25				17.0	8.4							
25-30				18.3	9.2							
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It is pointed out that even this contrast is minimised since the deaths of men invalided out of the Army are not included as soldiers. There were differences according to occupation, but which should be taken as a standard? Should it be agricultural labourers (open air and so on) with a mortality of 8.0 per 1,000 or 6.1 in the provident ones who were members of friendly societies? Unfortunately the statistics of the Army could not supply the refinement of separating



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Then as to the causes, such as want of exercise, overcrowding, insufficient ventilation, and defective sewerage. Intemperate and debauched habits had been put forward as a cause, but there was no evidence that they were very different from the habits of the labourer or the mechanic.

The excess mortality could be traced to pulmonary disease, as shown in the following table of mortality rates per 1,000.

	Foot Guards	Inf. of the line	Civil popn. 24 large towns
Inflammation of the lungs, pleurisy and accatarrh Spitting of blood, consumption, chronic cata	1.3	1.3	0.5
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All causes	20.4	17.9	11.9

(Note. Most of the deaths from chronic catarrh were found from the evidence of post-mortems to have been really consumption).

Four causes are listed which in civil life contributed to this type of disease:—insufficient clothing; insufficient and unwholesome food; sedentary and unwholesome occupations; the vitiated atmosphere of unhealthy dwellings. But in the Army the first three can be eliminated, and therefore it is the last, the vitiated and polluted air of the barracks, which is chiefly at fault! And this is generated by overcrowding and deficient ventilation, and the absence of proper sewerage.

As an example of what could be achieved, the mortality of the army hutted before Sevastopol in 1856 was 12.5 per 1,000 as against 17.9 for the troops at home. "Perhaps no army was ever better cared for, or more sanitary precautions taken in its behalf as regards drainage, both of surface and subsoil, cleanliness, ventilation of huts, diet, clothing, etc. In the month of May alone the mortality was only 8 per 1,000 per annum." This (paraphrasing Miss Nightingale) was the most complete case on record, on the largest scale, of neglects committed, of consequences incurred, of remedies applied, and of consequent improvements in health and efficiency. It was in contrast to the period from 1st October, 1854, to 30th April, 1855, when the rate of mortality rose as high as 600 per 1,000 per annum.

As with the barracks, so with the hospitals. The mortality at Scutari and Kulalee, reaching 427 per 1,000 treated from 1st to 28th February, 1855, arose from causes other than the severe type of disease. "The drains were nothing better than cesspools, through which the wind blew sewer air into the wards. There was no ventilation; little or no lime-washing; the ward utensils infected the atmosphere; the hospitals were overcrowded."

And now, just as these things were remedied eventually in the field, so they should be for the troops at home. The remedies proposed are several, but we need only note here the recommendation that a statistical branch be formed in the Army Medical Department; the details were to be worked out by a committee (one of four that were set up, known as Sub-Commissions).

The lines of development are briefly set down. Accurate statistics are to be collected for the advancement of medical science (case-books also are to be examined with a view to publication). There should be registrars at hospitals to prevent the inextricable confusion of the returns during the war, and a new nomenclature is to replace Cullen's nosology of 1780.

The Commission fears the neglect that will attend the cause of hygiene if statistics are not kept that will allow the comparative state of health of every station to be judged, that will trace sickness to its various causes and ascertain their relative influence, so that precautions may be taken and remedies applied. Therefore an efficient statistical staff must be formed, directed by a person versed in such work. "For a man to be at once an authority in sanitary science, in statistics, in medicine, and in surgery, etc., etc., would be impossible. It is only by a division of labour that such duties can be performed with any chance of success." They further recommend that he, with two other colleagues selected for their eminence in medical and sanitary knowledge, should form a council to advise the Director-General (this was one of the recommendations from which Andrew Smith dissented).

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ASIAN INFLUENZA IN THE ARMY IN MALAYA IN 1957

BY

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Royal Army Medical Corps

AND

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Medical Service Corps, United States Army

Towards the end of April 1957 an outbreak of an obscure febrile illness in a Gurkha infantry battalion was reported to us by the medical specialist of the British Military Hospital at Kluang, Johore. This battalion had arrived in Kluang from Hong Kong fifteen days previously. The mode of onset of the outbreak and the distribution of early cases were suggestive of an arthropodborne viral disease, and preliminary investigations were made along those lines. However, within a few days, characteristics of respiratory disease became apparent, and it seemed obvious that we were dealing with influenza, which had just been reported in epidemic form in Singapore. Laboratory confirmation of this impression was achieved by isolation of Influenza A viruses from throat washings from these Gurkha patients, and it was found that these isolates were antigenically similar to the strain isolated in Singapore. The clinical characteristics of the disease were studied in 48 Gurkhas, and the serological antibody response was followed in 39 of them. In early May, influenza became widespread in Malaya, and additional influenza viruses were also isolated from a number of Malayan military and civilian cases occurring in the Kuala Lumpur area. Seven strains isolated during the outbreak were studied in detail in order to determine their characteristics and evaluate their relationship to influenza viruses of earlier years.

As the epidemic spread throughout Malaya, many medical officers gained the impression that the attack-rate among Asians was much higher than among Europeans. A similar observation was substantiated among civilian dockyard workers at the Singapore Naval Base, where it was thought that differing socioeconomic circumstances might have played an important role (Lim et al., 1957). Army camps in Malaya, where living conditions are very nearly equal for soldiers of all races, presented an ideal situation for comparing attack-rates between European and Asian soldiers. Therefore, a limited survey was undertaken at the end of the epidemic, in late June and July 1957, to determine the

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incidence of the disease in the Gurkha battalion already mentioned and in eight other British and Malayan army units in different parts of the country. In order to confirm the presence of the influenza virus in their respective units and to determine the incidence of asymptomatic infection, hæmagglutination-inhibition (H.I.) tests were carried out on single serum specimens collected from some of the men in these units who had been ill, as well as from a number who had remained well. Since the Asian 1957 influenza virus was antigenically unique and the human antibodies developing after infection did not react with previous strains, the H.I. test could be used for this purpose.

MATERIALS AND METHODS

Collection of epidemiological and clinical data. Epidemiological data on the Gurkha battalion outbreak were collected by on-the-spot inquiry and from the battalion medical officer's record of daily sick attendances. Clinical data were obtained from case records of Gurkhas treated at the British Military Hospital, Kluang. Clinical attack-rates in nine different army units were determined by interrogation of individuals at the end of the epidemic.

Sera. Specimens collected before, during and after the epidemic were stored at -20° C.

Viruses. Seven strains of Malayan 1957 influenza virus were isolated in 9 to 10-day-old embryonated hens' eggs from throat washings collected within the first three days of illness from Gurkha and Malayan patients. Hæmagglutinins for each of these strains were prepared from untreated allantoic and amniotic fluids of infected eggs. Hæmagglutinins for the influenza type strains PR8, FM-1, FW-1-50, FLW-1-52, IB-1, Lee and C-1233, were supplied by Walter Reed Army Institute of Research, Washington, D.C., and for the strains A/Malaya/7/54 and Netherlands/56 by the Institute for Medical Research, Federation of Malaya. Soluble complement-fixing antigen was prepared from one Malayan 1957 strain by grinding infected chorio-allantoic membranes (CAM) in veronal-buffered saline. The CAM suspension was then centrifuged at 3,000 r.p.m. for fifteen minutes and the supernatant was used as antigen.

Hæmagglutination-inhibition (H.I.) tests. The tube pattern test, as recommended by the Committee on Standard Serological Procedures in Influenza Studies (1950), was employed, using human group O erythrocytes. All sera were heat-inactivated before testing. Rooster antisera used had been pretreated with cholera filtrate, and human sera, except where specified below, were treated with potassium periodate by the method of Burnet & Lind (1954) to remove non-specific inhibitors. The highest (initial) serum dilution which partially inhibited hæmagglutination was recorded as the H.I. titre.

Complement fixation (C.F.) tests. A standard tube test of general application in United States Army laboratories was used. All sera were heat-inactivated before testing. Preliminary antigen and complement titrations were done. Serial twofold dilutions of serum were incubated with 2 units of antigen and

2 exact units of complement at 4° C. for eighteen hours; 3% sheep cells sensitised with 3 MHD amboceptor were then added and the tubes were further incubated at 37° C. for 30 minutes before reading. The C.F. titre was recorded as the highest (initial) serum dilution in which not more than 25% of the cells were hæmolysed.

OBSERVATIONS AND RESULTS

Epidemiological and clinical features of the outbreak in the Gurkha battalion

A Gurkha infantry battalion, consisting of a Headquarters Company, Support Company and four rifle companies, left Hong Kong by sea on 7 April 1957 and arrived in Malaya on 11 April, being based thereafter at Kluang, Johore. During the last week of April, three of the rifle companies, "B," "C" and "D," moved out to separate operational camps some miles from each other and from the main battalion base.

Prior to 26 April, no cases of influenza-like illness were reported in the battalion, but on that date, nineteen days after departure from Hong Kong and fifteen days after arrival in Malaya, influenza broke out in the base camp of the battalion and later appeared in two of the outlying companies, "C" and "D." The third outlying company, "B," had only two cases in all. The outbreak in the main camp reached its peak on 2 and 3 May and thereafter gradually died down over the next several weeks. The incidence of the clinical illness, as revealed by admissions to hospital, sick attendance records and interrogation of the whole battalion at the end of the epidemic, was 32% for the battalion as a whole, but varied widely between companies, the variation being most marked in the three outlying companies, "B" (2%), "C" (33%) and "D" (71%).

From the clinical data recorded on 37 soldiers in hospital and on 11 cases among families, the disease was characterised as a short, sharp, febrile illness of sudden onset with headache, pronounced malaise, backache, limb pains and a dry cough as prominent symptoms. Maximum pyrexia varied between 100° F. (37.8° C.) and 104.8° F. (40.4° C.) and the duration of fever varied between one and five days. There was no correlation between the degree of pyrexia and its duration. Residual malaise lasting several days after resolution of pyrexia was common. Physical signs in the chest were not a feature and there were no complications seen in this group of patients.

Characteristics of virus strains

A series of H.I. tests using various antigen-serum combinations, with and without periodate treatment of sera, was carried out to determine the characteristics of seven Malayan 1957 influenza-A strains isolated from Gurkha and Malayan patients.

Fig. 1 shows the results of tests between these various strains and untreated acute and convalescent sera of the seven patients from whom they were isolated, as well as the results of tests between three of these strains and periodate-treated sera. Results of tests between the seven strains and cholera filtrate-treated rooster antiserum to the Asian 1957 type-strain, A/Singapore/1/57, are

FIG. 1

RESULTS OF HABMAGGLUTINATION - IMHIBITION TESTS OF SEVEN NALATAN (1957)

INFLUENZA VIRISES WITH SERA OF PATIENTS FROM WHOM THEY WERE ISOLATED

AND ROOSTER AFTISERUM TO THE TYPE-STRAIN A/SINGAPORE/1/57

	PARTICULA	RS					B	ECIP	ROCA	L SE	RUM	TITRE	WI	TH IN	DICA	TED V	IRUS	ANT	IGEN			_
	OF SER			VIRUS ANTIGENS - A/MALAYA															Sca			
(Patient's initials and homologous virus number)		DAY OF DISEASE	8/57			9/	9/57		10/57			12	12/57		11/57		13/57		15/57			
		OF EACH SERUM	NPT A B C		A	PT A B C		NPT A B C		NPT PT		PT B C		NPT A B C	NPT A B C	A B C	NPT A B C	\rightarrow		ser		
GURKH	D.L. (A/M/8/57)	A = 2 B = 17 C = 56		ND		ND		20		NR.				n D		N.D.		ND		N.D.	, s	64 32 16 8 4 2
A SOLDIER	M.R. (A/M/9/57)	A = 1 B = 15 C = 50		7.0		ND		ND.		ND				N D		NB		ND		N D	N	32
ERS	K.R. (A/M/10/57)	A = 1 B = 19 C = 50		ΝЪ	-	N.D		ND		N D				MD		ND		ND		ИD	N)	31
(MALAYAN SOLDIER I.b.M. A/M/12/57)	A = 2 B = 12		~2		MP		12		n D		N)		N)		MD		NÞ		M)	~	31
MALAYA	A.L. (A/M/11/57)	A = 2 B = 14 C = 27																				81
N	MUR. A/M/13/57	A = 3 B = 17 C = 32																				32
CIVILIANS	A.H. (A/M/15/57)	A = 2 B = 15 C = 30																				64 32 6 6 7
I	A/SINGAPORE																					80

MPT = Serum not periodate-treated. PT = Serum periodate-treated. ND = Not done.

*Serum prepared at Welter Reed Army Institute of Research and treated with filtrate of Vibrio cholerae.

also shown. From this it can be seen that the seven Malayan 1957 strains were closely related to the type-strain, A/Singapore/1/57, and to each other. It was also noted that there were significant differences among the several strains in their susceptibility both to specific antibody and to non-specific inhibitors. The results also suggest that potassium periodate may be partially destroying specific antibody, with significant effect on results of tests with low titre sera.

Other H.I. tests were performed to evaluate the relationship of these seven Malayan 1957 strains to pre-1957 type-strains of influenza-A (PR8), A-prime (FM-1, FW-1-50 and FLW-1-52), B(IB-1 and Lee) and C (1233) and to exclude these earlier strains as causal agents in the Malayan 1957 epidemic. The first

world is the percentage per annum. . . . 0.52, 3.93 per cent look nothing. But multiply 3.9 by 52 = 2,028, in order to get the annual admissions per 1,000; and it will be found that the whole force will go twice through hospital in a year, at that rate. . . . Multiply 0.52 by 52 in the same way, and it will be found that the mortality is 270 per 1,000 per annum. In other words, that more than one-fourth of the whole population will perish in a year."

To sum up her methodology, "For the purposes of accurate comparison it is necessary to reduce all our facts

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Towards the end of April 1957 an outbreak of an obscure febrile illness in a Gurkha infantry battalion was reported to us by the medical specialist of the British Military Hospital at Kluang, Johore. This battalion had arrived in Kluang from Hong Kong fifteen days previously. The mode of onset of the outbreak and the distribution of early cases were suggestive of an arthropodborne viral disease, and preliminary investigations were made along those lines. However, within a few days, characteristics of respiratory disease became apparent, and it seemed obvious that we were dealing with influenza, which had just been reported in epidemic form in Singapore. Laboratory confirmation of this impression was achieved by isolation of Influenza A viruses from throat washings from these Gurkha patients, and it was found that these isolates were antigenically similar to the strain isolated in Singapore. The clinical characteristics of the disease were studied in 48 Gurkhas, and the serological antibody response was followed in 39 of them. In early May, influenza became widespread in Malaya, and additional influenza viruses were also isolated from a number of Malayan military and civilian cases occurring in the Kuala Lumpur area. Seven strains isolated during the outbreak were studied in detail in order to determine their characteristics and evaluate their relationship to influenza viruses of earlier years.

As the epidemic spread throughout Malaya, many medical officers gained the impression that the attack-rate among Asians was much higher than among Europeans. A similar observation was substantiated among civilian dockyard workers at the Singapore Naval Base, where it was thought that differing socioeconomic circumstances might have played an important role (Lim et al., 1957). Army camps in Malaya, where living conditions are very nearly equal for soldiers of all races, presented an ideal situation for comparing attack-rates between European and Asian soldiers. Therefore, a limited survey was undertaken at the end of the epidemic, in late June and July 1957, to determine the

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incidence of the disease in the Gurkha battalion already mentioned and in eight other British and Malayan army units in different parts of the country. In order to confirm the presence of the influenza virus in their respective units and to determine the incidence of asymptomatic infection, hæmagglutination-inhibition (H.I.) tests were carried out on single serum specimens collected from some of the men in these units who had been ill, as well as from a number who had remained well. Since the Asian 1957 influenza virus was antigenically unique and the human antibodies developing after infection did not react with previous strains, the H.I. test could be used for this purpose.

MATERIALS AND METHODS

Collection of epidemiological and clinical data. Epidemiological data on the Gurkha battalion outbreak were collected by on-the-spot inquiry and from the battalion medical officer's record of daily sick attendances. Clinical data were obtained from case records of Gurkhas treated at the British Military Hospital, Kluang. Clinical attack-rates in nine different army units were determined by interrogation of individuals at the end of the epidemic.

Sera. Specimens collected before, during and after the epidemic were stored at -20° C.

Viruses. Seven strains of Malayan 1957 influenza virus were isolated in 9 to 10-day-old embryonated hens' eggs from throat washings collected within the first three days of illness from Gurkha and Malayan patients. Hæmagglutinins for each of these strains were prepared from untreated allantoic and amniotic fluids of infected eggs. Hæmagglutinins for the influenza type strains PR8, FM-1, FW-1-50, FLW-1-52, IB-1, Lee and C-1233, were supplied by Walter Reed Army Institute of Research, Washington, D.C., and for the strains A/Malaya/7/54 and Netherlands/56 by the Institute for Medical Research, Federation of Malaya. Soluble complement-fixing antigen was prepared from one Malayan 1957 strain by grinding infected chorio-allantoic membranes (CAM) in veronal-buffered saline. The CAM suspension was then centrifuged at 3,000 r.p.m. for fifteen minutes and the supernatant was used as antigen.

Hæmagglutination-inhibition (H.I.) tests. The tube pattern test, as recommended by the Committee on Standard Serological Procedures in Influenza Studies (1950), was employed, using human group O erythrocytes. All sera were heat-inactivated before testing. Rooster antisera used had been pretreated with cholera filtrate, and human sera, except where specified below, were treated with potassium periodate by the method of Burnet & Lind (1954) to remove non-specific inhibitors. The highest (initial) serum dilution which partially inhibited hæmagglutination was recorded as the H.I. titre.

Complement fixation (C.F.) tests. A standard tube test of general application in United States Army laboratories was used. All sera were heat-inactivated before testing. Preliminary antigen and complement titrations were done. Serial twofold dilutions of serum were incubated with 2 units of antigen and

2 exact units of complement at 4° C. for eighteen hours; 3% sheep cells sensitised with 3 MHD amboceptor were then added and the tubes were further incubated at 37° C. for 30 minutes before reading. The C.F. titre was recorded as the highest (initial) serum dilution in which not more than 25% of the cells were hæmolysed.

OBSERVATIONS AND RESULTS

Epidemiological and clinical features of the outbreak in the Gurkha battalion

A Gurkha infantry battalion, consisting of a Headquarters Company, Support Company and four rifle companies, left Hong Kong by sea on 7 April 1957 and arrived in Malaya on 11 April, being based thereafter at Kluang, Johore. During the last week of April, three of the rifle companies, "B," "C" and "D," moved out to separate operational camps some miles from each other and from the main battalion base.

Prior to 26 April, no cases of influenza-like illness were reported in the battalion, but on that date, nineteen days after departure from Hong Kong and fifteen days after arrival in Malaya, influenza broke out in the base camp of the battalion and later appeared in two of the outlying companies, "C" and "D." The third outlying company, "B," had only two cases in all. The outbreak in the main camp reached its peak on 2 and 3 May and thereafter gradually died down over the next several weeks. The incidence of the clinical illness, as revealed by admissions to hospital, sick attendance records and interrogation of the whole battalion at the end of the epidemic, was 32% for the battalion as a whole, but varied widely between companies, the variation being most marked in the three outlying companies, "B" (2%), "C" (33%) and "D" (71%).

From the clinical data recorded on 37 soldiers in hospital and on 11 cases among families, the disease was characterised as a short, sharp, febrile illness of sudden onset with headache, pronounced malaise, backache, limb pains and a dry cough as prominent symptoms. Maximum pyrexia varied between 100° F. (37.8° C.) and 104.8° F. (40.4° C.) and the duration of fever varied between one and five days. There was no correlation between the degree of pyrexia and its duration. Residual malaise lasting several days after resolution of pyrexia was common. Physical signs in the chest were not a feature and there were no complications seen in this group of patients.

Characteristics of virus strains

A series of H.I. tests using various antigen-serum combinations, with and without periodate treatment of sera, was carried out to determine the characteristics of seven Malayan 1957 influenza-A strains isolated from Gurkha and Malayan patients.

Fig. 1 shows the results of tests between these various strains and untreated acute and convalescent sera of the seven patients from whom they were isolated, as well as the results of tests between three of these strains and periodate-treated sera. Results of tests between the seven strains and cholera filtrate-treated rooster antiserum to the Asian 1957 type-strain, A/Singapore/1/57, are

RESULTS OF HARMAGGLUTINATION - INHIBITION TESTS OF SEVEN MALATAN (1957)
INFLUENZA VIRUSES WITH SERA OF PATIENTS FROM WHOM THEY WERE ISOLATED
AND ROOSTER ARTISERUM TO THE TYPE-STRAIN A/SINGAPORE/1/57

	PARTICULA OF SER		_					WITH IN			GEN		
	SOURCE (Patient's	DAY OF DISEASE	8/5	VIRUS ANTIGENS - A/MALAYA 8/57 9/57 10/57 12/57 11/57 13/							/57	Scal of reci roca	
	nitials and homologous irus number)	OF EACH SERUM	NPT A B C	PT A B C	NPT A B C	NPT A B C	PT A B C	NPT A B C	NPT A B C	NPT A B C	NPT A B C	PT A B C	seru
GURKH	D.L. (A/M/8/57)	A = 2 B = 17 C = 56	A B C	A B C	A B C	A B C	A D C	A B C	A B C	A B C	ND.	A D C	6+6 326 166 86 46
HA SOUDIERS	M.R. (A/M/9/57)	A = 1 B = 15 C = 50	N.D.	ND ND	ND ND	ND		N D	MD	N.D.	ND	N.E	- 646 - 326 - 186 - 86
ERS	K.R. (A/M/10/57)	A = 1 B = 19 C = 50	MÞ	~ D	ND	ND		ND	ND	MP.	нъ	n à	- 646 - 326 - 166 - 46 - 26
(MALAYAN SOLDIER I.b.M. A/M/12/57)	A = 2 B = 12	N D	MD	мэ	ND	ND		MP	WD	MD	~D	320 320 160 80
MALAYA	A.L. (A/M/11/57)	A = 2 B = 14 C = 27			700								840 820 160 80 20
N	MUR. A/M/13/57	A = 3 B = 17 C = 32											6+0 320 160 90 40 20
CIVILIANS	A.H. (A/M/15/57)	A = 2 B = 15 C = 30											640 320 80 40 20
I	A/SINGAPORE								N				800 400 200 100 250 425

MPT = Serum not periodate-treated. PT = Serum periodate-treated. ND = Not done.

*Serum prepared at Welter Reed Army Institute of Research and treated with filtrate of Vibrio cholerae.

also shown. From this it can be seen that the seven Malayan 1957 strains were closely related to the type-strain, A/Singapore/1/57, and to each other. It was also noted that there were significant differences among the several strains in their susceptibility both to specific antibody and to non-specific inhibitors. The results also suggest that potassium periodate may be partially destroying specific antibody, with significant effect on results of tests with low titre sera.

Other H.I. tests were performed to evaluate the relationship of these seven Malayan 1957 strains to pre-1957 type-strains of influenza-A (PR8), A-prime (FM-1, FW-1-50 and FLW-1-52), B(IB-1 and Lee) and C (1233) and to exclude these earlier strains as causal agents in the Malayan 1957 epidemic. The first

two Malayan 1957 strains to be established in eggs produced negative results (serum titre less than 1 in 10) when tested with cholera filtrate-treated specific rooster antisera to each of the above-mentioned pre-1957 strains. When the hæmagglutinins of these pre-1957 strains and one Malayan 1957 strain were tested with untreated paired sera from 10 clinical influenza cases in the 1957 outbreak, the 10 pairs of sera all gave negative results (less than fourfold rise of titre) with all the pre-1957 strains, except in one instance which, when repeated with periodate-treated serum, was also negative. All 10 pairs of sera, on the other hand, gave positive results (fourfold or greater rise of titre) with the Malayan 1957 strain.

These results demonstrated that the Malayan 1957 strains were antigenically distinct from the seven pre-1957 strains tested and that the latter were not implicated in the Malayan 1957 epidemic.

Serological tests on sera from 39 clinical influenza cases in Gurkhas at Kluang, April-May 1957

C.F. and H.I. tests were carried out on sera from 39 Gurkha clinical influenza cases, consisting of 33 soldiers, 2 wives and 4 children. From each case at least two serum specimens were tested, one collected in the acute phase of the illness (1st-5th day) and one in the convalescent stage (15th-32nd day). From 30 of the 33 soldiers a late convalescent specimen (48th-63rd day) was tested in addition. The soluble antigen used in the C.F. tests was prepared from a strain, A/Malaya/10/57, isolated from one of these Gurkhas, and in the H.I. tests this same strain and three A-prime strains of recent years, FLW-1-52, A/Malaya/7/54 and Netherlands/56, were employed. Prior to H.I. tests all the sera were treated with potassium periodate.

The results of C.F. and H.I. tests with A/Malaya/10/57 revealed a fourfold or greater rise of antibody titre by one or other or both tests in all 39 cases. Both tests were positive in 31 cases (79%), the H.I. test alone in 3 (8%) and the C.F. test alone in 5 (13%).

The results of H.I. tests with the three pre-1957 A-prime strains revealed fourfold or greater rises of titre in sera from 9 of the 39 cases—two with both FLW-1-52 and A/Malaya/7/54, two with FLW-1-52 alone, two with A/Malaya/7/54 alone and three with Netherlands/56 alone. In seven of the nine cases, the rise was less than with the 1957 virus; in one (with FLW-1-52) it was equal, and in one (with A/Malaya/7/54) it was greater.¹

In order to illustrate graphically the pattern of H.I. and C.F. antibody response to infection with the 1957 strain in these 39 clinical cases and to show the comparative activity of these same sera in inhibiting hæmagglutination of the A-prime strains of recent years, the 109 sera from these cases were divided into four groups according to the day of disease on which they were collected. The geometric mean day of disease of each group was then plotted against the geo-

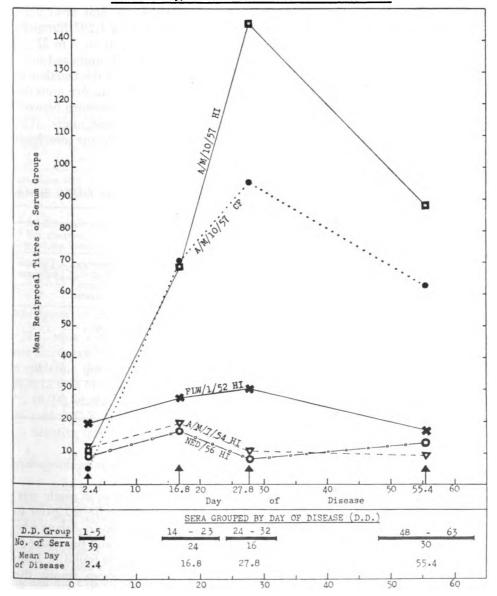
¹ Since isolation of virus was not attempted in each of these 39 cases it is possible that one or more of these other A-prime agents also may have been involved in the Gurkha 1957 outbreak; but if true, these other agents must have been of minor importance.



metric mean reciprocal antibody titre of the group (Fig. 2). To facilitate calculations of mean titres all specimens not showing H.I. activity at the lowest dilution of 1 in 10 were assigned a nominal reciprocal titre of 5, and those not showing C.F. activity at the lowest dilution of 1 in 5 were assigned a nominal reciprocal titre of 2.

FIG.2

HAEMAGGLUTININ-INHIBITING AND COMPLEMENT-PIXING ANTIBODY
RESPONSE IN 39 CASES OF CLINICAL INFLUENZA IN GURKHAS



The maximum observed titres of both H.I. and C.F. antibody to the 1957 strain, A/Malaya/10/57, were found in the 24th-32nd day group of sera and there was a considerable (30-40%) fall-off of activity in the late convalescent group (48th-63rd day). The mean titre of H.I. antibody activity against the A-prime strains, FLW-1-52, A/Malaya/7/54 and Netherlands/56, remained at a low level in all four serum groups.

Clinical attack-rates among European and Asian soldiers

The results of interrogation of 2,257 individual soldiers in nine army units at the end of the epidemic are summarised in Table 1. Among 1,297 European soldiers in six units the over-all attack-rate was 9% (varying from 7 to 22%). There was no significant difference between those in all-British units and those in mixed British-Malayan units. Among 700 Gurkha soldiers in the battalion at Kluang the attack-rate was 32%. Among 260 Malayan soldiers in five units the over-all attack-rate was 30% (28-38%), with no significant difference between those in all-Malayan units and those in mixed British-Malayan units. The over-all clinical attack-rate for Asian soldiers (Gurkhas and Malayans combined) was 32%.

Table	1.	Clinical	influenza	attack-rates	among	European	and	Asian	soldiers	in	nine
				army units in	Malay	a in 1957.					

Eur	ropeans		Asians				
Types of units of unit influer		Clinical influenza	Types of units	Proportion of unit	Clinical influenza		
	strength investigated	%		strength investigated	%		
British Infantry Battalion Other All-British	100%	7	Gurkha Infantry Battalion All-Malayan	100%	32		
Units Mixed British-	71%	15	Units Mixed British-	8%	31		
Malayan Units*	100%	12	Malayan Units*	100%	30		
Total Europeans investigated	95%	9	Total Asians investigated	54%	32		

Same units.

Hæmagglutination-inhibition tests on single sera

In order to establish a diagnostic level of H.I. antibody titre in single sera, H.I. tests with A/Malaya/10/57 virus were done on 90 sera collected prior to September 1956 from 30 Europeans, 30 Gurkhas and 30 Malayan Asians who presumably had not experienced infection with the 1957 virus, and the antibody levels in these three groups were then compared with the levels found in acute phase sera (1st-5th day) from the 39 serologically proven cases among the



Gurkhas at Kluang in 1957. This revealed (Table 2) that the maximum titre to be expected in 99% of sera from individuals of which these four groups were samples was less than 1 in 40. Thus, it was considered on this basis that a serum titre of 1 in 40 or greater in H.I. tests on single sera with A/Malaya/10/57 indicated previous infection with Asian 1957 influenza virus.

Table 2. Comparisons of levels of H.I. antibody to A/Malaya/10/57 virus in sera collected prior to September 1956, and in acute phase specimens from 39 serologically proven cases of influenza in Gurkhas at Kluang, April-May 1957.

		Number	H.I. antibo	ntibody¹ against A/M/10/57 virus			
Stud	dy Groups	of specimens tested	Mean reciprocal titre of Group ²	Standard Deviation (\sigma)	Maximum reciprocal titre expected in 99% of theoretical group ⁸		
Sera Collected prior to	European Gurkha Malayan	. 30	9.3 9.2 8.3	6.1 7.8 5.1	25.8 30.3 22.1		
September 1956	Total subjects mean titres	1 00	8.9	6.4	26.2		
	e sera of Gurkha April-May 1957		10.8	9.96	37.7		

¹ All H.I. tests were performed with periodate-treated sera.

⁸ Values expressed were calculated from Mean Titre $+2.7\sigma$.

Serodiagnosis of European and Malayan clinical cases

H.I. tests with A/Malaya/10/57 virus on single sera from about 20% of those European and Malayan soldiers who stated on interrogation at the end of the epidemic that they had experienced an influenza-like illness gave positive results (a titre of 1 in 40 or greater) in 65% (11/17) of the Malayans, but in only 33% (8/24) of the Europeans. The negative sera from these tests were also subjected to C.F. tests with R.I.67 viral antigen to exclude adenovirus infection, with negative results in all cases.

Serodiagnosis of asymptomatic infection

H.I. tests with A/Malaya/10/57 virus on single sera from 8% (38/475) of the Gurkhas, 30% (54/181) of the Malayans and 12% (140/1183) of the European soldiers who stated on interrogation that they had remained well throughout the epidemic gave positive results (a titre of 1 in 40 or greater) in 29% (11/38) of the Gurkhas, 46% (25/54) of the Malayans and 7% (10/140) of the Europeans. The infection-rate among those Asian soldiers (Gurkhas and Malayans combined) who had not experienced a clinical illness was thus 39% (36/92).

² For purpose of calculation of mean antibody titres all specimens not showing inhibitory activity at the lowest serum dilution of 1 in 10 were arbitrarily assigned a reciprocal antibody titre of 5.

Acute phase specimens were collected between 1st and 5th day of disease.

DISCUSSION

The sequence of related events during April and May 1957 is interesting:

- 7 April. Gurkha battalion left Hong Kong for Malaya.
- 11 April. Gurkha battalion arrived in Malaya.
- Second half of April. Epidemic influenza reported in Hong Kong (W.H.O. 1957).
- 26 April. First three cases of influenza reported in the Gurkha battalion at Kluang, Johore.
- 4 May. Extensive outbreak of influenza reported in Singapore (W.H.O. 1957).
- 6 May. Influenza reported in civil population of Federation of Malaya (Smith et al., 1957).

It seems highly probable that the Gurkha battalion acquired its infection in Hong Kong, although epidemic influenza was not reported there until some days after it had left. The interval of nineteen days between the departure of the Gurkhas from Hong Kong and the eruption of the epidemic in the battalion, during which no illness was observed in these soldiers, may be compared with the almost simultaneous interval preceding the appearance of epidemic influenza in Singapore and Malaya, but should be contrasted with the subsequent very rapid spread among communities in Malaya. This in part seems to support the theory that influenza virus may be introduced and widely seeded in a community and only later give rise to an epidemic (Andrewes, 1953).

The demonstration in hæmagglutination-inhibition tests of differences among seven Malayan 1957 strains in susceptibility to non-specific inhibitors in human sera and to specific antibody, and the absence of correlation between these differences, stresses the importance of finding strains of A/Asia/57 virus which combine good specific antigenic activity with a very low level of susceptibility to non-specific inhibitors. Such strains would be of great value as diagnostic antigens.

The pattern of complement-fixing and hæmagglutinin-inhibiting antibody response to natural infection demonstrated in 39 clinical cases in Gurkhas indicates that maximum antibody response to the Asian 1957 virus is not reached until 28 days or longer after the onset of illness, which is considerably longer than the 10-14 days normally expected in influenza (van Rooyen & Rhodes, 1948).

Based upon the results of interrogation of 2,257 soldiers in nine army units at the end of the epidemic and of H.I. tests on single sera from samples of men who had remained symptom-free, it is possible to estimate that, of every 100 Asian soldiers, about 59 were infected with the virus and 32 of these became ill, whereas, of every 100 European soldiers, only about 15 were infected and 9 of these became ill. It is thus apparent that, although the infection rate was almost four times higher among Asian soldiers than among Europeans, the proportion of infected individuals who developed clinical symptoms was almost the same in both groups. No satisfactory explanation of the wide difference in infection rates between Asian and European soldiers can be offered.

SUMMARY

Some aspects of the 1957 epidemic of Asian influenza, as it affected the army in Malaya, are described.

The epidemic first appeared at the end of April 1957 in a Gurkha infantry battalion which had recently arrived from Hong Kong, about one week before influenza was first reported in Singapore.

Seven strains of influenza virus, isolated from Gurkha and Malayan patients, were characterised by means of hæmagglutination-inhibition tests, and although all were found to be closely related to the type-strain, A/Singapore/1/57, significant differences were found among them in their susceptibility both to specific hæmagglutinin-inhibiting antibody and to non-specific inhibitors.

The antibody-response to infection with this virus was studied by hæmagglutination-inhibition and complement-fixation tests on sera collected serially from 39 clinical cases at different stages of their illness, and it was found that maximum antibody response occurred about 28 days or more after the onset of clinical symptoms.

Interrogation of individual soldiers in nine army units at the end of the epidemic indicated that the clinical attack-rate was about 32% among Asian soldiers and 9% among Europeans.

Hæmagglutination-inhibition tests on single sera collected at the end of the epidemic indicated that, among those soldiers who had remained symptom-free, 39% of the Asians and 7% of the Europeans had been infected with the virus.

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IDENTIFICATION OF MICROFILARIAE ENCOUNTERED IN WEST AFRICA

BY

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The standard morphological descriptions of microfilariæ tend to gloss over several very real difficulties in identification. Satisfactory staining of the dead organism sometimes seems impossible, measurement of distances along the organism (see, e.g., Belding, 1952) is often impracticable because of its irregular disposition, and the tip of the tail, recognised as the site of certain distinctive features, is frequently hidden under another part of the organism. In addition, sheaths are not always stained sufficiently to be recognisable, and the characteristic rhythmicity of certain species is not absolute, so that microfilariæ may be found "out of hours," particularly in heavy infections. Supra-vital staining with methylene blue, which brings out certain other characteristics, has not been found adequate for final identification in many cases.

These notes are based on work done in evolving satisfactory methods of species identification, and it is hoped that they may be useful especially to those unaccustomed to these organisms. The microfilariæ concerned are those of Wuchereria bancrofti, Loa loa and Acanthocheilonema perstans in the blood, and Onchocerca volvulus and A. streptocerca in the skin.

METHODS

Blood

Using capillary blood, wet and dry preparations are made. The latter is rather thicker than the thick film made for malaria diagnosis, and it is allowed to dry while the wet preparation is examined and is discarded should that examination prove negative. If microfilariæ are found, however, the thick film is stained for species identification. When drying is complete, the preparation is dehæmoglobinised by flooding the slide with tap-water and allowing it to stand until the colour has run out of the drop (one change of water may help). The water is then poured off, and the preparation allowed to dry again.

For routine work, 1 per cent methylene blue in water is a simple and satisfactory stain. The preparation is covered with it, and allowed to stand for at least ten minutes (temperature 25°-30° C.) The stain is then washed off with tap-water, and the slide after drying is ready for examination. The whole area of the preparation itself is covered with immersion oil, and surveyed systematically under the low power. The one-twelfth objective is used for detailed study of microfilariæ as they are found. It is important to examine all the microfilariæ in the preparation, and not just the first one encountered: a mixed infection may be present.

While most microfilariæ (imf.) found in the blood in West Africa will stain well, some, usually those of L. Loa, do not, and a better preparation will be required before a positive diagnosis can be made. The hæmatoxylin method of Fülleborn (Faust, 1949), modified by counterstaining for two minutes with 1 per cent eosin, was found to give good results, even with mf. of L. loa. It was used on dried films, dehæmoglobinised as already described. For permanent preparations, mounting the dried film after staining in Canada balsam has been found satisfactory, the formal dehydration of Fülleborn's method being unnecessary.

With practice, mf. of A. perstans can sometimes be identified in the wet preparation, as its breadth is distinctly less than the diameter of the red cells. Furthermore, the sheaths of those species which have them can sometimes be made out. However, the movement of the organisms and the numerous red cells often make these observations difficult and unreliable.

Concentration methods, using haemolysed venous blood and centrifuging, may be used when suspected cases of filariasis prove persistently negative with the capillary blood method. The methods described by Harris & Summers (1945) primarily for quantitative studies, using saponin, and by Whitby & Britton (1950) using acetic acid, are satisfactory. The re-suspended deposit is dried on a slide and stained as already described. Similarly, a deposit from centrifuged urine or hydrocele fluid may be stained in the same way.

Skin

A snip of clean, unanæsthetised skin is taken by raising the epidermis on the point of a needle and slicing off a fragment with a sharp razor or scalpel-blade. The fragment should include some dermis. It is then teased out in a drop of water on a slide, and examined under the low power for motile microfilariæ. Distinction between mf. of A. streptocerca and that of the much commoner O. volvulus can usually be made at this stage (see below), but other species may be present if there is much blood in the preparation, in which case it is more satisfactory to have a stained preparation. This is made by allowing the wet preparation to dry, and then staining as for blood.

The site of the skin snip is determined by clinical considerations, e.g., near the outer canthus if ocular involvement is suspected, or over a nodule suspected to be onchocercal. For routine purposes, however, and in the absence of other special indications, the upper part of the buttock or the iliac crest is most satisfactory.

MORPHOLOGY OF MICROFILARIAE

Mf. of A. perstans (Fig. 1). This is the commonest variety in West Africa and may be found in the blood by day or night. It is small, its breadth being half or less that of the near-by white cells. It is often coiled on itself in a characteristic way like a piece of rope that has been thrown down on to the ground. There is no sheath. Its nuclei stain well with methylene blue, and present several characteristic features: they appear closely packed and rather coarse and angular, as though mutually compressed, and occupy most of the width

of the organism, the body itself on either side of the nuclear column being inconspicuous and staining poorly. The anterior nuclei have a characteristic arrangement, one, sometimes two, being in front of the rest and laterally placed. The "nerve ring" appears as a sharply defined but narrow gap in the column. A round nucleus occupies the tip of the rounded tail.

Mf. of W. bancrofti (Fig. 2). The feature of periodicity is well known, but distinction from mf. of L. loa cannot always be made solely on this basis: an occasional mf. of W. bancrofti may be found during the day in capillary blood, and in other fluids, e.g., hydrocele fluid, or urine, periodicity may not be demonstrable at all. This microfilaria is large, its breadth being not much less than the diameter of a white blood cell. Its disposition in smooth sweeping curves, and its sheath, are well known. It usually stains well with methylene blue but occasionally unaccountably does not. The nuclei tend to be rounded, small and well spaced, and give the impression of orderly arrangement. The excretory pore is small, but much easier to appreciate is the very characteristic arrangement of the tail nuclei. There is a distinct interval between the pointed tip of the gently tapering tail and the end of the nuclear column; the nuclei, as it were, only exist as far down as the width of the organism will permit. The terminal four nuclei are somewhat elongated and are arranged in single file in the midline of the organism. The next three more rounded nuclei usually conform to the same line, but the most proximal may be laterally placed. The next two nuclei are conspicuously laterally placed, on opposite sides. There are then between two and five more nuclei in single file, before the start of an irregular double column. Minor modifications of this pattern may be met with (as would be expected in a two-dimensional view of a cylindrical organism containing some eccentric nuclei), but the general appearance is very characteristic and the pattern shown in Fig. 2 and described above is the most common.

Mf. of L. loa (Fig. 3). Fairly strict diurnal periodicity is exhibited, but the remarks made in this connection, under the heading "Mf. of W. bancrofti," are relevant also here. Mf. of L. loa is large, being on the average broader and longer than mf. of W. bancrofti, and is sheathed. Its disposition tends to be characteristic; its curves are multiple, irregular, short and often sharp. In preparations made by concentration methods, however, this feature is often absent, the curves resembling those of mf. of W. bancrofti. Staining with methylene blue is often poor, the nuclei being indistinct even after prolonged staining, and the sheath may not be visible at all. Carefully performed hæmotoxylin and eosin staining, however, brings out nuclear detail well, and shows the large excretory pore. The nuclei are coarse and rather large and show much overlapping, and those in the tail present distinctive features. In addition, the shape of the tail itself is characteristic. There is a rather sudden narrowing where the body becomes the tail, and the tail itself, often sharply curved on the body (mf. of W. bancrofti may also show this particular feature), does not narrow much more before the tip, which close inspection will show to be rounded rather than pointed. The general appearance of the tail is that of a loose appendage to the body instead of (as in mf. of W. bancrofti) an even continuation



Fig. 2.—Mf. of W. bancrofti

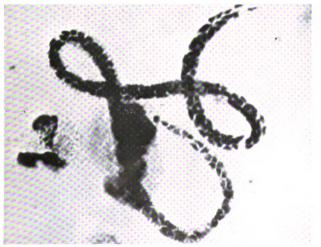


Fig. 1.—Mf. of A. perstans

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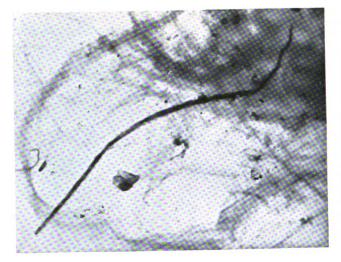


Fig. 5.—Mf. of A. streptocerca

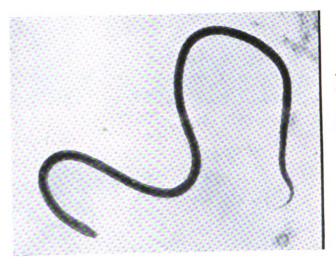


Fig. 4.—Mf. of O. volvulus

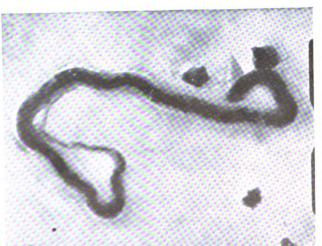


Fig. 3.—Mf. of L. loa

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of it. In the tail are five large and markedly elongated nuclei in single file, the last reaching to within its own width of the tip. Occasionally one of them may be replaced by two smaller nuclei. The last one or two nuclei of the body itself may lie separately, and in line with the tail nuclei, but they are rounded and quite small.

How widely different are the appearances in the tail in mf. of W. bancrofti and mf. of L. loa is best seen by comparison of Fig. 2 with Fig. 3. The complete dissimilarity throughout the organism in typical specimens is also well shown.

Mf. of O. volvulus (Fig. 4). Two forms of this microfilaria are said to exist, a large and a small, but descriptions of their measurements show overlapping of the two groups and the effect is to indicate merely a wide range of sizes. There is no sheath. With practice, identification is possible in the wet preparation by noting the characteristic sharply pointed tail which is often smoothly curved back on the body. This can be confirmed after staining; methylene blue is adequate for this, but hæmatoxylin and eosin enable other details to be made out. The zone free of nuclei at the head end is longer than it is broad, and is widest at about the level where the nuclear column starts. The body becomes a little narrower behind this point, and the result is that the head end has an outline reminiscent of that of a snake's head. The "nerve ring" is prominent, and the nuclei of the tail stop well short of the tip.

Mf. of A. streptocerca (Fig. 5). This is an unusual type, found in the skin. A well-known feature which may not be present, particularly in dried preparations, is the curved tail, the rest of the body being straight; the appearance has been likened to that of a shepherd's crook. The tip of the tail is rounded. Hæmatoxylin and eosin staining shows a strikingly narrow microfilaria, tapering gradually at both ends. The "nerve ring" is relatively more posterior than in other microfilariæ. The anterior nuclei have a characteristic arrangement: the first is rounded and occupies most of the width of the organism and behind it is a group of three in an oblique single file. Dyce Sharp (1927) noted a characteristic arrangement of the first four nuclei, and described all four as being "in echelon." Behind these is a row of about six in straight single file before an irregular double column starts. None of the other four species has more than two nuclei in single file at the anterior end. Attention is more usually given to the nuclei of the tail of mf. of A. streptocerca, but these seem to show up less distinctly.

SUMMARY AND CONCLUSIONS

The usually described points of morphological difference between the species of microfilariæ, as found by staining after death, have often been found by personal experience to be unreliable in practice.

Laboratory methods found to be satisfactory are described, and the more distinctive features of the species found in West Africa enumerated.

Mf. of A. perstans, mf. of O. volvulus and mf. A. streptocerca are quite unlike each other, and readily distinguished with very little practice. In any case, the first occurs in the blood, and the others in the skin.

Mf. of W. bancrofti and mf. of L. loa may, however, be confused for the reasons given. With practice, many points of difference can be recognised, but it is suggested that the appearances of the nuclei throughout the tail (and not just features peculiar to the tip), being quite unlike in the two species, and easily seen in stained films, afford a reliable means of distinction.

Photographs illustrate these points, as it seems that photographs or accurate drawings to show practical points of distinction between microfilariæ are rare in textbooks or in the literature generally.

These notes are based on experience at the Military Hospital, Kaduna, Northem Nigeria, and I am grateful to Mr. A. E. Clark for the photomicrographs.

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TRIMEPRAZINE TARTRATE (VALLERGAN) AS A PREMEDICATIVE DRUG IN CHILDREN

BY

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From The British Military Hospital Singapore

When faced with the prospect of accepting nasal gas and oxygen for dental extractions, many children are frightened and consequently become uncooperative. To overcome this, many oral sedatives and tranquillising agents have been tried, including methylpentynol, seconal, and promezathine. The latter drugs, although satisfactory in many ways, have the disadvantage that, if given in adequate dosage to produce a contented and co-operative child, the recovery period is too long. Elixir seconal is unpalatable to some children and there is a definite incidence of vomiting of the drug shortly after it is given.

With a view to finding a more satisfactory drug, Vallergan (Forte) was tried here over a period of two months. During that time a total of 155 cases underwent dental extractions under nitrous oxide and oxygen delivered from a McKesson apparatus via a nasal mask.

The ages of the children varied between two and a half and nine years. They were mainly of British, Gurkha or Malay nationality, with an occasional Tamil and Chinese. It was found that the Malay children were always the most tearful and unconsolable. It was therefore deemed necessary to use a slightly larger dose of Vallergan (Forte) for children of that nationality.

The dose recommended by the manufacturers is 0.5 to 1.5 mg. per pound body-weight. The trial started with the dose calculated on the lower of these two figures. The aim was to find the minimum dose for rapid recovery commensurate with adequate co-operation, but without actual production of sleep. In the first 11 cases it was found that this was too small a dose to be satisfactory. It was therefore increased to 0.6 mg. per pound body-weight. The Vallergan was dispensed as a solution containing 6 mg. per millilitre so that calculation of dosage was simplified. Thus the number of millilitres required equalled one-tenth of the body-weight in pounds. This dosage was used in the remaining 144 cases. With the exception of Malays mentioned above, it was found to be very satisfactory both from the point of view of a peaceful, co-operative child and the short recovery time. This was never more than five minutes longer than when compared with nitrous oxide and oxygen used alone without previous sedation.

This method was used for all children requiring from one to nine teeth extracted, and included one boy in whom all four first permanent molars were extracted satisfactorily, in spite of their being remarkably difficult teeth.

Despite the fact that Vallergan (Forte) is said to possess but slight action as an antisialogogue, atropine was not used at all throughout the trial and there was no evidence of excessive salivation in any case receiving the drug.

Owing to the short duration of these anesthetics and the difficulty of doing more than note the pulse, respirations, and colour, it is inadvisable to make categorical statements. There have, however, been no clinically demonstrable side effects, toxic results, or evidence of sensitivity. One case of vomiting occurred post-operatively, but that was in a child who had obviously swallowed a quantity of blood from the tooth socket. One Malay and one Chinese child rejected the Vallergan shortly after it had been given. The Chinese child, however, remained co-operative and was induced satisfactorily. The Malay child had to be given full sedation with seconal. This necessitated hospitalisation for the consequent prolonged recovery period.

Of the 114 European children there were three who remained unco-operative on the standard dose of 0.6 mg. per pound and who were regarded as failures as far as the trial was concerned. It is felt, however, that short of full basal narcosis, these children would have been unco-operative with any other technique.

SUMMARY

The use of trimeprazine tartrate (Vallergan (Forte)) as a tranquillising agent in children, prior to dental extraction under nitrous oxide and oxygen, is reported. Results have been very satisfactory, untoward effects nil and failures minimal. The failure of the standard dose in Malay children was noted and a further trial with an increased dosage is being carried out.

I should like to thank Brigadier R. A. Stephen, C.B.E., F.R.C.S., Consultant Surgeon, FARELF, for help in the preparation of this article; Lieut.-Colonel E. Ferguson, R.A.D.C., Specialist Dental Officer, B.M.H., Singapore, who was responsible for the dental care of all the cases in the trial and Messrs. May & Baker Ltd., Singapore, for the generous supply of Vallergan (Forte).

TUBERCULOSIS AMONG THE GURKHAS AND THEIR DEPENDANTS*

SERVING WITH THE UNITED KINGDOM FORCES IN THE FAR EAST

BY

Lieut.-Colonel JOHN MACKAY-DICK, O.B.E., M.B., F.R.C.P.(E.)

Royal Army Medical Corps

THE Gurkhas serve in Malaya, Singapore and Hong Kong (FARELF). Whereever in FARELF the Gurkhas are found to have tuberculosis, steps are taken immediately to have them admitted to the Gurkha Sanatorium (100 beds) in the British Military Hospital, Kinrara, some nine miles from Kuala Lumpur, the capital of Malaya.

The Gurkha recruit

Provided the Gurkha is physically fit and fulfills the required standards, and that always includes a normal chest radiograph, he is accepted for service. The Heaf test is carried out in every case. All negative reactors have B.C.G. vaccination. Careful documentation is carried out in all cases. After the Heaf test becomes positive all such cases have an annual Heaf test and radiograph of the chest for the next five years.

Recruits who have a normal radiograph of the chest and a positive Heaf test on first acceptance for service have a radiograph of the chest every three years, provided, of course, they do not subsequently become contacts of cases of notifiable tuberculosis, when other arrangements, to be mentioned later, are followed.

The Gurkha soldier

Every three years of completed service the Gurkhas have six months' leave in Nepal. Radiographs of the chest are taken immediately before and on return from this leave.

Gurkha infants and children

All Gurkha infants and children aged three years and under who have a positive Heaf test, in the absence of evidence of active disease, radiological or otherwise, are given routine anti-bacterial drug therapy for tuberculosis.

Notification

On the diagnosis of tuberculosis being established, all cases are notified in writing to the unit concerned, the medical directorate and the civil authority. However, in order to get action with the minimum of delay a signal is sent to

^{*} An address given to the N.A.P.T. Commonwealth Chest Conference in the Festival Hall, London, on Thursday, 3 July, 1958.

the unit concerned notifying the case and requesting immediate "contact action" (see below). A copy of this signal is sent to: (a) the D.D.M.S. (or equivalent) for the information of the A.D.A.H., who keeps a central register of all cases of tuberculosis; and (b) the Colonel, the Brigade of Gurkhas.

Contacts

A contact may be defined as a person who has been living, working or otherwise associating intimately with a person who has notifiable tuberculosis. Where there is a case of tuberculosis, all individuals in the same household, in the same regimental (or pipe) band, or who work in the same office or classroom, or sleep in the same barrack room, hut, tent or bivouac, share the same jungle patrol, or eat at the same table are examined to discover the source of the infection.

The unit medical officer immediately takes action to trace all contacts as defined above and gets in touch with the nearest British Military Hospital. Frequently within twenty-four hours of receipt of the signal of notification, contacts report for a chest radiograph.

Those contacts with a normal chest radiograph also have a Heaf test carried out and have chest radiographs repeated every three months for two years, sixmonthly for the next two years, and then at the end of the fifth year after contact. All such contacts are carefully documented. The dates and results of each chest radiograph are sent to the A.D.A.H. for his central contact register.

Civilians employed with the Brigade of Gurkhas

All such civilians have routine M.M.R. by the Army Mobile M.M.R. teams. All cases of tuberculosis, so-called quiescent disease or otherwise, are referred to the civil authority for investigation and management.

Army Mobile M.M.R. teams

There are two M.M.R. teams in Malaya and one in Hong Kong. The former tour Malaya and Singapore, taking routine M.M.Rs. of Gurkha troops, families and locally employed civilians. The latter does likewise in Hong Kong. Two observers read the miniature radiographs. Large films are taken in doubtful cases.

Unit Tuberculosis Registers

Each Gurkha unit maintains a register in respect of dates of: (a) routine radiography in all cases; (b) follow-up of all B.C.G. vaccination cases; (c) follow-up of all contacts. As regimental medical officers are never very permanent these days, the commanding officer of each Gurkha unit has a responsibility in the keeping up to date and accuracy of this register.

Six-monthly conference

Every six months a conference is held in Malaya to review the progress of

the campaign against tuberculosis and to discuss problems which may have arisen. Those present include all specialists connected with the tuberculosis campaign in Malaya, a representative R.M.O. from the Brigade of Gurkhas, together with the Colonel, the Brigade of Gurkhas, and the Gurkha Liaison Officer (a Lieutenant-Colonel—in command of a Gurkha unit). The medical staff officer of the Federation Army attends as an observer. The presence of combatant officers from the Brigade of Gurkhas shows how much the combatant officers realise their responsibility in the successful prosecution of this campaign against tuberculosis. Their help and co-operation are invaluable.

Gurkha Sanatorium, B.M.H., Kinrara

In the last quarter of 1951 the Gurkha Sanatorium came into being when an 18-bedded ward was officially opened. By the second quarter of 1952 this had increased to 90 beds, including accommodation for Gurkha women. In 1953-4, 125 beds in all were occupied at one time. The peak was reached in 1956 when 146 beds were occupied.

The staff consists of a senior medical specialist and medical officers who have either been trained in the modern treatment of tuberculosis at Midhurst or at the Army Chest Centre in the United Kingdom, nursing officers Q.A.R.A.N.C., a British lady welfare officer, British and Malayan nursing orderlies, a Gurkha N.C.O. interpreter, a Gurkha clerk and a senior N.C.O., R.A.E.C. All members of the staff have a positive Heaf test and normal chest radiograph on first appointment. They have a repeat chest radiograph every six months. Some have had B.C.G. vaccination.

The senior N.C.O., R.A.E.C., holds education classes. All Gurkhas are now trained in the "24 Procedures" and for the first aid certificate of the St. John Ambulance Brigade, while selected Gurkhas are trained as laboratory technicians and radiographers.

The Gurkha liaison officer is a frequent visitor to the sanatorium and is readily available at all times should his services be required. The British lady welfare officer devotes her entire energies to the welfare of the Gurkhas, with conspicuous success. Her efforts are well known and include being in charge of their library. Briefly she is their "father and their mother." The patients have excellent facilities for gardening, handicrafts, hobbies of all sorts, including photography, reading, entertainment and sport. The Brigade of Gurkhas' own newspaper, written in Gurkhali, *Parbate*, is very popular and contains information of great interest to the Gurkhas.

As far as possible all patients are accommodated in wards according to their regiment. Outside each ward there is the crest of the regiment. There may be more than one. The regimental and therefore corporate spirit is further fostered by the sanatorium medical officers, who wear the black badges of rank and the Gurkha divisional shoulder flash (crossed *kukris*) worn by officers of the Brigade of Gurkhas. All Gurkha festivals and customs are honoured with due respect. There is a special Gurkha kitchen where all Gurkha food is handled, prepared

and later served by Gurkha cooks from electrically heated trolleys. Meat is "on the hoof" and is duly dispatched in traditional style outside the kitchen.

There is keen friendly rivalry between the wards, who compete eagerly for the gardening cup which is awarded every month and for a shield containing badges of all regiments in the Brigade of Gurkhas which is awarded weekly to the best ward, so judged on the hospital commanding officer's weekly inspection.

The high morale of all patients is to be experienced to be fully appreciated. This is particularly aided by the fact that all families of patients are accommodated as far as possible in the family lines of a neighbouring Gurkha unit. In this way they can visit their menfolk at frequent intervals.

Ambulant non-infectious cases of pulmonary tuberculosis and also cases of pleural effusion are eligible to apply for leave at intervals after at least six months' chemotherapy, but depending of course on the case. They proceed to a special leave centre where chemotherapy is continued. There are also special occasions which arise when leave may be granted if particularly indicated—for example, Dashera, Delhi Day, Deepvali, birth leave, christening leave.

Thoracic surgery

The officers, warrant officers, N.C.Os. and men are sent to the Army Chest Centre in the United Kingdom. There are facilities for thoracic surgery for women at the Lady Templer Hospital, Kuala Lumpur, where emergency thoracic surgery in either case would be performed.

The first batch of Gurkhas (21) for thoracic surgery in the Army Chest Centre left Kuala Lumpur by air on 19 June 1957. Eight were operated on in July, and were on their return journey to Malaya by sea in October 1957. On arrival in Kinrara they were all in great heart. They had all been to London and said it was "a very nice village" and they had all seen the "Queen's house," too.

Seven of these cases were accepted for further service in the Army. The exception had had a resection of the left upper lobe, including the lingula. To date, 101 Gurkhas have had partial lung resection. Five of them have had the operation performed on both lungs. Three Gurkhas have had thoracoplasty carried out—one of these cases had bilateral thoracoplasty. All operations have been successful, and it is anticipated that all cases of unilateral resection at least are fit for retention in the service. Cases are normally accepted for resection when the site, character and extent of the irreversible disease makes the advantages of resection self-evident (Mackay-Dick, 1958).

To date all cases for resection, with very few exceptions, have had at least twelve months' chemotherapy, and in most cases for considerably longer.

The absence, presence and characteristics of Mycobacterium tuberculosis (if any) in the resected specimens should be a pointer as to the value or otherwise of prolonged chemotherapy in sterilising caseous lesions or resulting in non-virulent strains or strains so attenuated that they are incapable of growth on culture or of producing characteristically fatal disease on animal inoculation.



Resected specimens in all cases are being carefully examined by Dr. Lynno Reid and Dr. R. W. Riddell at the Institute of Diseases of the Chest, London, and by pathologists at the Army Chest Centre. The results of these examinations to date appear to confirm the hopes of long-term chemotherapy in sterilising residual caseous foci (Eade et al., 1959) and confirm the efficacy of one particular régime of chemotherapy used at Kinrara (Mackay-Dick & Slattery, 1958).

Not all apparently solid disease, assessed as such on tomography, is necessarily caseous or fibro-caseous. It is interesting to note how some apparently solid disease shows progressive clearing after twelve months and more of chemotherapy (Eade *et al.*, 1959). That and the effect of the sterilising of caseous lesions with long-term chemotherapy in no way weakens the case for resection in selected service cases, but may lead to further discussion as to the optimum time for resection where facilities for skilled thoracic surgery are available.

Post-operative chemotherapy is continued for twelve months after thoracic surgery has been performed. Many cases therefore have much more than twenty-four months' chemotherapy in all.

The Gurkha's natural dislike of having a planned operation on his chest for reasons other than trauma had to be overcome, particularly when that necessitated removal of part of a lung. He is far from proud of scars on his body which are not the result of battle. That difficulty was surmounted by explaining to him that we were all in the battle against the unseen enemy, the germ of tuberculosis, and that operation scars on the chest were really battle scars, the result of victory in the battle with tuberculosis. That view the Gurkha has accepted and now he wants to know when he is going to have an operation. And if not Why Not?

On first admission to hospital all patients are mentally attuned to the fact that if they do as advised by their medical officers cure will follow. Their faith is touching and rewarding.

It is our intention that every case of tuberculosis, whether or not thoracic surgery is carried out, should receive at least twenty-four months' drug therapy on full pay and allowances. If necessary that period may be increased to thirty months in special cases. On completion of active treatment it is then decided how many Gurkhas will be selected for continued service in the Army.

We define "quiescent disease" as "quietly active disease" necessitating at least twenty-four months' chemotherapy whether or not thoracic surgery is carried out. These twenty-four months of treatment are carried out in at least three of the following locations and in all four when thoracic surgery is carried out: (i) Gurkha Sanatorium, Kinrara; (ii) the Army Chest Centre in the United Kingdom; (iii) the country (convalescent) branch of the Gurkha Sanatorium, B.M.H., Cameron Highlands, situated 5,000 feet above sea level, some 150 miles from Kinrara; and (iv) the Gurkha Rehabilitation Centre at Seremban, some 40 miles from Kinrara.

All cases in Malaya receive a complete review every six weeks by the senior specialist at Kinrara, who also visits B.M.H., Cameron Highlands and Seremban, at intervals.

Sanatorium régime

Every Gurkha on admission to the Gurkha Sanatorium, Kinrara, receives a new copy of the Sanatorium Booklet printed in Gurkhali. It gives much useful information concerning the modern approach to tuberculosis, its cure and prevention. Each Gurkha reads and re-reads it repeatedly. It is given a place of honour in each bedside locker. There is a foreword by the Major-General, the Brigade of Gurkhas.

The Gurkha, fine soldier that he is, does not understand having to be confined to bed when he feels well, so up he gets. As a result, once he becomes bacteriologically negative he is officially allowed up except for the two hours' strict bed rest, compulsory for all patients, every day from 12 noon to 2 p.m. Originally it was the intention to keep patients with cavitated disease in bed preferably at posture, until cavity closure and resection at the optimum time, but a compromise had to be made.

The following system of coloured cards, originally suggested by Captain D. A. D. Slattery, M.B.E., R.A.M.C., is used. These cards are kept at the head of the bed and are quickly understood by the patients.

RED CARD. On admission the patient is confined to bed except for toilets until he is proved to be bacteriologically negative. Every case is initially assessed clinically, bacteriologically, radiologically and from the relevant laboratory points of view, and thereafter every six weeks. All cases have full plate A.P. tomography on first assessment, while lateral tomography is also carried out in all cases of unilateral disease and in selected cases of bilateral disease where the disease is minimal on one side. In this way the nature, character and radiological extent of the disease is determined as far as possible. Tomography may be repeated in selected cases depending on the case, so that the extent and degree of radiological clearing may be adequately assessed where relevant. Zonal tomography, i.e. coning down only on the areas of disease, is only carried out after full-plate tomography has determined its full radiological extent.

GREEN CARD. Being bacteriologically negative, the patient is on restricted activity in and around the wards, walks in the grounds, light gardening, diversional therapy and education classes in the ward, etc.

YELLOW CARD. The patient is up all day, dressed in hospital clothing, but, like all patients, he has two hours' strict bed rest from 12 noon to 2 p.m. daily. For all up-patients there is a carefully regulated physical rehabilitation scheme to suit each category of up-patient.

Drug Therapy

This consists of streptomycin 1 g. daily together with I.N.A.H. 100 mg. twice daily for 60 to 90 days, depending on the case. Thereafter both drugs, in the doses stated, are given on the *same* day together every second day to complete twenty-four months. This régime was first choice at Kinrara from 1955 to 1958, and was developed from a similar régime which was first adopted in the

Army Chest Centre in 1953 (Mackay-Dick & Rothnie, 1954). Its particular value appears to have been confirmed elsewhere (Hutton et al., 1956).

If for any reason these drugs cannot be given together we give P.A.S. 10 g. (2.5 g. \times 4) daily with I.N.A.H. 100 mg. twice daily. In recent months we did not give these drugs continuously but for three monthly periods separated by one drug-free month.

Drug reaction and drug intoxication are watched for carefully. Reactions with streptomycin have been rare and when they do occur it is during the daily administration of the drug. (N.B. Almost without exception our patients are well under forty years of age.) I.N.A.H. has caused no trouble whatsoever. P.A.S. we dislike for its well-known disadvantages. We only use it when forced.

Only six cases are recalled where sputum remained persistently positive for many months before eventually becoming negative. In two of these cases the sputum quickly became negative when the total daily dose of I.N.A.H. (given with streptomycin 1 g.) was stepped up to 450 mg. These cases had fibro-caseous and persistently open cavitated disease normally with cavitory systems. Of the two cases where the total daily dose of I.N.A.H. was stepped up, one had an "emergency" right upper lobectomy at the Lady Templer Hospital. The other had resection of the left upper lobe, including the lingula, at the Army Chest Centre.

In cases of pleural effusion chemotherapy is carried out for a minimum of eighteen months in all cases where a parenchymal lesion is not noted on routine tomography. In the presence of a parenchymal lesion chemotherapy is continued for twenty-four months. Otherwise our treatment is as has already been outlined (Mackay-Dick & Rothnie, 1954).

Diet

All patients have an excellent diet supplemented by the following every day: One bottle (or can) of stout; three compound vitamin tablets; three ferrous sulphate tablets; cod-liver oil and malt.

Expectant mothers

Tuberculosis in expectant mothers is not in itself regarded as an indication for the interruption of pregnancy. Parturition proceeds uneventfully. After the birth of the baby the mother insists on her baby having one feed of her breast milk duly expressed for the purpose. Honour is thereby satisfied. The mother is then happy for her baby to be looked after in a tuberculosis-free environment where B.C.G. vaccination is carried out. In due course the baby is cared for in the Gurkha family lines of a neighbouring Gurkha unit.

Other forms of treatment

We do not use A.P. or P.P. while phrenic crush is never used unless associated with resection.



Follow-up

All patients and families remaining in the service after twenty-four months' chemotherapy, or longer, with or without thoracic surgery, are followed up. For one year they are employed in a restricted category. We have started giving oral out-patient drug therapy during the period.

It should be mentioned that cases returning to civil life in Nepal do not leave Malaya immediately on completion of twenty-four months' chemotherapy. It takes time to complete arrangements for passages, while no travel is possible during the monsoon period. Therefore for an additional period of three months or so individuals continue with chemotherapy. Finally when they do leave Malaya we arrange for them to have a three months' supply of P.A.S. and I.N.A.H. In other words, all our patients really receive a minimum of thirty months' chemotherapy, while those who remain in the Army complete a minimum of thirty-six months' chemotherapy.

Nepal is mountainous country and communications are poor. Life is rigorous and the normal expectation of life is not normally considered to be greater than fifty to sixty years. There is said to be one doctor to every 174,000 inhabitants.

Action is taken to follow-up radiologically all tuberculous pensioners. These include pensioners who have not had present-day facilities of the Gurkha Sanatorium in Malaya. Action is being taken to offer treatment to such of these cases who show evidence of recrudescence of activity of tuberculosis. Their dependants are to be included in this scheme.

The future

With the detailed prosecution of the anti-tuberculosis campaign among the Gurkhas, and their families, in the Brigade of Gurkhas, FARELF, particularly those cases who have had resection, it is anticipated that the incidence of relapse cases will have been reduced to a bare minimum.

It is understood that successful B.C.G. vaccination in Heaf test-negative reactors will reduce the incidence of tuberculosis in such individuals by some 80 per cent. That being so, as a preliminary, a W.H.O. tuberculin skin test survey of Nepal with successful B.C.G. vaccination of all negative reactors, together with chemotherapy for all Heaf test-positive infants and children of three years and under (in the absence of other evidence of tuberculosis), would be a great first step in the conquest of the disease in Nepal.

Yesterday and today

A few years ago the acquisition of tuberculosis meant to the Gurkha soldier the end of his chosen career and, indeed, the premature end of the road. It was a case of *Lochaber No More* for these Gurkha clansmen who march proudly to the skirl of the pipes and who wear, in many cases, in their headdress-flashes the tartans of Scotland. Today when the Gurkha soldier stands in the shadow of tuberculosis he knows that we shall go forward together to final victory over

that once dreaded disease; so that he may return to his regiment and "soldier on" or return to a healthy vigorous life in his small holding in Nepal.

I am grateful to Lieutenant-General Sir Alexander Drummond, who first envisaged this entire scheme when he was A.D.M.S., H.Q., Malaya Command, and who has pursued it with inspiring determination to the present day; to Lady Templer, whose productive interest in the welfare, health and happiness of the Gurkhas has been a source of great encouragement; to Sir Geoffrey Todd, honorary consultant physician in pulmonary tuberculosis to the Army, who has trained our specialists in this field; to the Major-General, the Brigade of Gurkhas, and his regimental officers, who recognised and pursued the invaluable part to be played by them in this anti-tuberculosis campaign; and to Mr. G. Kent Harrison, thoracic surgeon at the Army Chest Centre. I must also pay tribute to the tireless devotion of all medical, nursing and welfare officers and all the British and Malayan nursing orderlies, and instructors in the R.A.E.C., for their part in the increasing success of this great work.

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THE WILL TO LIVE*

BY

Lieut.-Colonel E. M. TURNER, M.B.E., R.R.C.

Queen Alexandra's Royal Army Nursing Corps

PROBABLY most of us, at some time during our life, find ourselves up against circumstances when we need all our will-power to help us survive.

The will to live! How deeply rooted is this basic urge? How does it manifest itself. and when, if ever, are we conscious of it? That it is there is indisputable. It is at the core of existence. Because of it nations survive, through travail and tribulation, and the individual no less than the nation. Indeed, in times of acute stress it is, and has always been, the most prominent quality of the social order, the driving force of human achievement. Is this will to survive linked with a faith, or belief? I feel sure that it is,

When I left a blazing Singapore Harbour on Friday, 13 February 1942, for "an unknown destination"—probably Java—it never entered my head that I would not eventually get there. I think I embarked quite cheerfully, though

[•] A talk given at the Director-General's Exercise, October 1959.

very concerned about the people who had been left behind. As things turned out, I never saw Java, for on the following day we had a direct hit, and before I had time to think further I found myself in the water. I managed, with several others, to reach a small near-by island. There we remained for three days, tending the sick and wounded.

At six o'clock in the morning of the third day we were taken off by a small cargo boat. This second voyage was short. At nine o'clock that night we had two direct hits, and the boat, with practically all on board, sank in five minutes.

The ship's officers managed to throw overboard a few small rafts before the vessel went under. With another Nursing Sister I got hold of two of these rafts (which were only large enough for one person to sit on), and we joined them together. During the night we picked up fourteen people, including six children. We took turns sitting on the rafts, holding the children, while those in the water held on the ropes. It is difficult to think back as to what then were my reactions. I suppose all of us were rather stunned—so much had happened since we left Singapore. It was not a bright prospect to find oneself part of a floating mass in the Indian Ocean. Between us and the horizon there was not a sign of help anywhere.

With no food or water, and with the tropical sun beating down—a brazen spear-point, as it seemed—was it surprising if gradually, one by one, hands which had been holding on to the trailing ropes, or raft, let go and slowly drifted away? I do not think, at this stage, the thought had crossed my mind that I would not survive. Came the second day. I was left sitting on the raft with only one other woman. Next day she, too, slipped off, and I was alone. There was not a ship in sight, nor sign of land.

It was at this moment that I became acutely conscious of the will to live. I was determined that I would hold on to life as long as it was humanly possible. I prayed that help would come, and felt very definitely that some unseen power was watching over me. Why me, and not those others who had drifted away? But let that be. I managed to collect a few drops of rain-water in the lid of my powder compact, and also ate some seaweed which floated near the raft. I wondered how long I could survive without food and fresh water—perhaps a few more days! I had no opportunity of knowing, as on the evening of the fourth day I sighted a large vessel coming towards me. The unexpected had happened, sweeping away, in one exhilarating moment, further speculation. I little knew then that I was landing myself in more trouble.

The ship was a Japanese battleship. I was hauled aboard. By this time I was burnt black by the sun, and could possibly have been taken for a native. The ship's doctor—a Japanese who had been trained in America—was very good to me, and when it was discovered that I was British I was taken to Banka Island. There I spent the next three and a half years as a prisoner of war.

We were moved from camp to camp, save for six months I spent out of camp, working in a native hospital. Then, for no reason—with another Q.A.—I was put into a small cell in a native jail for a further six months.

These months in jail—the longest six months of my life—left us with plenty of time to think. However, we realised that introspection would not help us. Not that way lay the will to survive, to win through in the end. Boredom we consciously or subconsciously avoided, and with practically no resources we kept ourselves fully occupied. We found that a draught-board could be quite effective chalked on the prison floor, and it was a major achievement to us when we had collected sufficient stones on our twice-daily five-minute exercise to play our first game of draughts. We never neglected our daily walk, though only four paces up and down the cell floor. In our imagination we were not in a cell, but walking the leafy lanes of England, and there was always (in our imagination, of course) a wonderful meal at the end. England! Should we ever see England again? How grateful I was for those pleasant memories of home, and how comforting they were in those dark days!

Eventually—was it after centuries?—I was released from jail, and returned to the prisoner-of-war camp. It was certainly a case of the survival of the fittest—not that anyone was really fit as time went by. Never for one moment did we give up hope as to how the war would end, nor lose faith in our country. We were often weak and ill, but provided we could keep going somehow we seemed to gain strength and courage. We felt that if we gave in we might not get up again from those boards.

I was lucky; I had a profession. Although the nursing was rather a hopeless kind of nursing—no drugs or medicines—we were kept busy. In addition, of course, we had all the other work in the camp to do—wood-chopping, cooking, making clothes out of improvised materials. When not working—which was not often—we occupied ourselves with home-made cards, and a mah-jong set made from pieces of wood. We had concerts with people humming in imitation of various instruments, etc. We were winning through; the will to live had again taken command.

Looking back on it now, some fourteen years after it all ended, and trying to see what were the most important things that helped me through, I would say that first of all self-discipline, which had been instilled into me during my years of training, was probably the greatest factor in my own survival; in any emergency or moment of crisis one's first thought was how to deal with the situation with every outward appearance of calm and confidence. Another important factor was our attitude towards the enemy; one could not really actively hate them, for if so one became angry and life in prison with such strong emotions might prove impossible, but we did feel contempt for our captors and it is just as well the Japs did not realise how much we used to laugh at them.

And last, but by no means least, there is the place of religion in such situations. I cannot say, I am afraid, that I said my daily prayers on the raft, but I did have implicit trust in God and called for His help often during those four days.

The thought did strike me also, "Am I only conscious of God's true existence in times of supreme crisis? I must resolve, if saved, to do better in the future and recognise Him without wanting something in return."

LIFE ON ST. KILDA, PAST AND PRESENT

BY

Captain D. G. BODDINGTON, M.B.

Royal Army Medical Corps

A HUNDRED and ten miles west of Scotland, and forty-five miles west of the nearest land in the Outer Hebrides, stands the foreboding island of St. Kilda. Foreboding and possibly even cruel when approached over the seas, but losing much of its severity once viewed from firm ground without the swell of the Atlantic underfoot, its overawing grandeur and isolation provided ready material for Victorian romance, but finally overpowered the inhabitants, causing their evacuation in 1930.

For more than twenty years the Village Street with its single row of houses persisted in memory of a once thriving population, with only birds, sheep, mice and infrequent summer visitors who succeeded in crossing from the Hebrides disturbing the solitude.

Unlike several other islands around Scotland, however, human activities were soon again to be seen, for in 1957 the R.A.F. landed to prepare the island as an observation post for the guided weapon range on South Uist, and during that year and the first half of 1958 men with machines did what no previous inhabitant had even conceived.

In August 1958 the Army took over the responsibility of the Range, and so it was that the Village Bay on Hirta, the main island of the group of four, once again had a small group of habitations on its shore; but houses with a difference, for whereas light and heat were previously provided by burning the oil of fulmar petrels, now generators supply a continuous current of electricity.

For hundreds of years the natives relied almost entirely on the birds that spent the summer on the cliffs for food and fuel, and used the feathers to pay the Factor as rent or barter for goods otherwise unobtainable on the two occasions in the year that he came. The main island of Hirta alone, though only two and three-quarter miles long, held twenty thousand pairs of fulmars, and a further ten thousand inhabited the other islands. Puffins and gannets were also included in the diet, but the fulmar was by far the most important, and even the hours spent during the winter months of 1958-9 carrying food from the R.A.S.C. boat, the *Mull*, our monthly supply vessel, to the pier and unloading it under conditions involving a high skill in maritime gymnastics, could not better the agility and strength displayed by these islanders in their descents down cliffs, in places over a quarter of a mile high, to procure eggs and birds to ensure their survival.

Cliffs and birds are still here to admire, if only from the top, and there is some comfort in knowing that tonight's supper has just been transferred from a tin to the cooking pot, and does not need fetching from a cliff ledge nine hundred feet below. However much our dependence on birds has declined, our reliance

on the sea still exists, perhaps even more, for food, equipment and relief personnel all arrive by the *Mull* in winter and landing-craft in summer, and the sailings of these vessels and their landing on arrival are all at the mercy of the storms that sweep the island during the year, at times during their most tempestuous moments flinging spindrift in great clouds across the island so that nowhere is immune from salt spray.

During the winter the arrival of the mail is most looked forward to, for about every ten days a passing Fleetwood trawler anchors in the bay to await the small boat launched by willing hands, more often than not leaving many wet people when the boat has finally been dragged up the rocks and slipway with its precious load. Electricians, cooks, radar mechanics, nursing orderlies, and all ranks participate in an operation which brings letters, newspapers and films and, as often these efforts are in wind, rain, and heavy seas, an issue of rum also.

Even the mail service is an improvement on the old method, for apart from tourist ships and the biannual visit of the Factor, the only method of sending letters was by raft, a method which, relying on the Gulf Stream that gives the island such a mild winter climate, had fair success in reaching some part of Scotland.

"What do you do there all the time?" This is the question put to many people when returning to civilisation after a spell on the island. Most people find something with which to occupy their non-working hours, whether it be fishing from the pier or one of the unit boats, woodwork, photography or birdwatching, and most people admit reading many more books than was their previous custom. Three times a week film shows are held, and on most nights the canteen-cum-bar, the "Puffinn," is busy. Half the work on the island is concerned with self-survival and the remainder directly concerned with the use of St. Kilda as an observation post.

How do the R.A.M.C. occupy themselves?

The Medical Centre is lavishly equipped as is fitting with the long periods of isolation likely to be encountered and lack of medical aid further to what we can ourselves provide. The small garrison hardly provides enough medical work, especially as colds and influenza, so often common on a winter sick parade at a mainland unit, are rare; but injuries from rock clearing, gales and vehicles form a large proportion of those who report sick. So it is that the medical staff of two, a sergeant and nursing orderly, besides the medical officer have taken over several decidedly non-medical jobs since arriving in the autumn, mainly running the canteen, issuing the rations and supervising the messing. making daily weather records and sending three-hourly reports during the day by wireless to the nearest airport in the Hebrides, organising the postal service. and have even for a time put their hands to haircutting. With the conjunction of the Nature Conservancy a good laboratory has been set up, and many investigations, which would otherwise have been done in hospital, have been carried out here. With those that cannot, the specimens are sent on their two-week journey by trawler, being lowered into the hold containing the fish and ice in a polythene bag. The ever-present chance of carrying out a major operation, perhaps after a cliff accident, means that all the staff are familiar with the use of Mountain Rescue equipment and anæsthetic apparatus, and many hours were spent during the autumn of 1958 filling teeth which might have given greater trouble during winter months.

Gone are the days when, as was the custom here, all illnesses were treated by forcible feeding with whisky and milk.

Sick parades are not confined to those on the island only, for trawlers bring in sick and injured men, and on at least one occasion the sergeant came across gross language difficulties when a Spaniard reported sick. A patient who showed little respect for any of the staff was a young gannet, a bird with a wing span of five feet and a bill both powerful and sharp, both of which he used to our disadvantage. Found on the rocks and recently having left the colony of twenty thousand pairs of birds on Boreray, one of the islands in the group where a fifth of the world population breeds, his saviours decided a PULHEEMS imperative before his release.

Besides the gannets and fulmars there are probably just under two million pairs of puffins on the group of islands, a bird whose quaintness and fearlessness brings reward to any hours spent watching on the long grassy slopes during summer evenings; evenings which only half-heartedly become night, allowing only a brief time for the shearwaters and petrels, those birds of the night whose weird calls on the boulder slopes often cause even the most stout-hearted to wish for company other than the swishing and crowing birds in the air around him.

St. Kilda is renowned as the biggest seabird nesting colony in the British Isles or even the North Atlantic, but it is as a station for observing birds migrating to and from Greenland and Iceland that it has lately become important. Birds are caught in nets and numbered rings put on their legs so that recognition is possible at other migration stations or in their breeding grounds across the seas, and when an avalanche of birds occurs the medical officer is kept constantly supplied with birds as they are released from the nets behind the Medical Centre. Two or three of those here during the winter have shown great interest in the rich animal life present on the island, and canteen conversations often revolve round aspects of past life on the island, odd birds seen during the day, and photographs taken on the island and developed in the dark room.

Such is life on St. Kilda among a small group of men in a small corner of the village bay surrounded by high hills—a group of men who, unlike the previous inhabitants of the now skeleton houses along the turf-covered street, know a life of bright lights, but are still able to enjoy a quieter yet rougher one on this storm-tossed island. This is no place for a soldier who is not prepared to lay his hand to any job, at any time of the day or night, who thrives on daily letters, or who is not prepared for a little submarine immersion when landing a boat. For someone who is, and one who would like to develop interests in photography or natural history, time spent on St. Kilda would prove time profitably spent.

Book Reviews

THE STRANGE STORY OF DR. JAMES BARRY. Isobel Rae. London: Longmans, Green & Co. 1958. Pp. 124+vii. 13s. 6d.

In this short book Isobel Rae has said the last word, unless fresh evidence unexpectedly appears, about Dr. James Barry and "his" strange career in the Army Medical Service. It is the product of much careful research and a full bibliography is given, chapter by chapter, at the end.

The reviewer has spoken of Barry as a man, but Miss Rae has no doubt that the doctor was a woman. She has accepted the evidence to this effect, and only one who had studied the subject as carefully could be in a position to dispute her opinion.

She has had access to new material in the "Barry Papers," which were made available to her by the War Office. It is no fault of hers that the new evidence is somewhat disappointing, consisting, as it does, of the account, given at secondhand, of one whose professional qualifications were those of a charwoman who also laid out the dead. It was this woman who stated that Barry had borne a child when young, basing her opinion upon the presence of striæ gravidarum on Barry's dead body. It may be conceded that, as the mother of nine children herself, she was likely to be right. One can only wish that the doctors who attended Dr. Barry had been less overawed by her rank and personality, and had made effective physical examinations. Particularly must one wish that Staff-Surgeon-Major D. R. McKinnon, who gave the death certificate, had examined her body.

The book raises many questions, in addition to the main one of Barry's sex. Who were her parents? Where was she born? Why did she go home without leave from Mauritius? Why was she sent home from St. Helena under arrest? When was her child born and what happened to it? These, amongst others, seem unlikely to be answered.

The book gives an absorbing picture of the background of the Army Medical Service over a period of nearly fifty years; it is interesting to note that this year (1959) is the centenary of Barry's retirement. Her career was undoubtedly arduous, but she saw active service only twice: once in the West Indies, during a slave rising which was over in five days, and again during a period of three months' leave which she spent with the 4th Division before Sebastopol. It would have been otherwise for her during the corresponding years of the present century.

This book will appeal to those who are interested in military medical history, and also to those who like a well-told story spiced with mystery. R. J. N.

LUNG FUNCTION TESTS. B. H. Bass, M.D., M.R.C.P. (Lond.). London: H. K. Lewis & Co. Ltd., 1958. Pp. 72+viii. Illustrated. 8s. 6d.

The author states that this book is a simple introduction to the principles of pulmonary physiology. He divides the process of respiration into five components and describes the tests available to investigate each particular function.

The tests which measure ventilation are the simplest to perform, and can be carried out by the interested clinician. These tests also give all the necessary information required in the majority of cases. The remaining tests require more complicated apparatus and constant practice of the techniques required and should be left to the respiratory physiologists. This book will be useful to those who wish to know what simple tests of lung function are available and how they are performed.

S. B.

MEDICAL HISTORY OF THE SECOND WORLD WAR. (R.A.F. Medical Services, Vol. III, Campaigns). S. C. Rexford-Welch. London: H.M.S.O., 1958. Pp. 730+xxv. Illustrated. £5 5s.

Volume III of the History of the R.A.F. Medical Services in the Second World War deals in detail with the overseas theatres in which there was a major R.A.F. medical effort. The only omission appears to be in the 1941-42 campaign in the Far East. Each theatre has a chapter to itself, but unfortunately all do not follow the same general pattern. The main subjects dealt with for each campaign include a short operational summary, a medical narrative of events, health and preventive medicine, and hospital facilities.

The volume contains a mass of detail and statistics, and appears to record the establishment and every subsequent move of each R.A.F. M.R.S., M.F.H. and general hospital overseas. Nevertheless, it is on the whole easy to read and its value as a reference book is enhanced by a good index. The Army reader's principal interests are naturally in the health section and in those parts dealing with inter-service co-operation and with the air evacuation of casualties. Help given by the Royal Navy and the Army gets full acknowledgement, but conclusions are frequently drawn regarding the need for a separate R.A.F. medical service at all levels, including hospitals and medical supply. Occasionally one felt that the facts tended in the other direction towards the need for more centralised control of logistic and medical effort.

The principal comments and lessons on casualty air evacuation are in Volume I of this series. There is nevertheless some very useful information in this volume, and the principles for the successful organisation of casualty air evacuation as laid down by P.M.O. R.A.F. Western Desert in 1942, and reproduced on page 139, are as valid today as seventeen years ago. Officers concerned with planning casualty air evacuation could with advantage read p. 502 et seq on the early days in Normandy.

The book is produced in accordance with the high standards we have come to expect from H.M.S.O. The maps and illustrations are clear, but some of the photographs are a little indistinct and their relevance is not always apparent. But these are minor criticisms. This is an invaluable history of the work of a great service in war.

R. I. M.

ECOLOGICAL PROCESSES. Alan Mozley, D.Sc., Ph.D., F.R.S.E. London: H. K. Lewis & Co. Ltd. 1959. Pp. 68+xii. 9s.

This philosophical little book deals with the relationships between animals and their environment in general, and with molluscs in particular. The writer

discusses a variety of teasing problems; what happens when a community of plants and animals is destroyed so that the site becomes unoccupied? How does an animal find its habitat? What interplay of environmental factors determines the pattern of life in any particular area? The writer illustrates theory and supports logical argument by giving details of field studies of molluscan fauna.

This book would be of interest to those who like to philosophise on the subject of natural history, particularly if they wish to make a special study of molluscs.

M. M. L.

GREY TOUCHED WITH SCARLET. Mrs. Jean Bowden. London: Robert Hale Ltd., 1959. Pp. 173+xvi. Illustrated. 18s.

Mrs. Jean Bowden describes some of the experiences of the Army Nursing Sisters in various theatres of war during 1939-45. It is attractively written, full of interest and shows the team spirit and mutual reliance of medical officers, sisters and medical orderlies.

This is a book worth the writing and reading.

M. M. W.

THE ORGANIC PSYCHOSES. J. G. Dewan, M.D., Ph.D., D.P.M., F.R.C.P., and W. B. Spalding, M.D., F.R.C.P. London: Oxford University Press, 1959. Pp. 170+xiii. 48s.

With the modern view that there is a close relationship between psychoses and neuro-physiological abnormalities it is appropriate that a new textbook on organic psychoses should appear. The object of the book is to be a guide to diagnosis in organic mental illness and in this it succeeds. The method of presentation is unusual and at first it would appear to be wrong that the specific psychiatric symptoms are not described with the individual clinical syndromes. On further reading, however, it is realised that this is an advantage because the mental symptoms are of no specific help in the differential diagnosis. The case histories are good, the appendix on technical procedures useful and the bibliography excellent. In short, it is a valuable guide and synopsis, for any medical library.

J. McG.

A SHORT PRACTICE OF SURGERY. Hamilton Bailey, F.R.C.S., and McNeil Love, M.S., F.R.C.S. London: H. K. Lewis & Co. Ltd., 1959. Pp. 1389 + xii. Illustrated. £4 4s.

This is the 11th Edition since this textbook of surgery first appeared in 1932. Much has happened during those twenty-seven years and A Short Practice is now not as short as it used to be. The present edition contains new chapters dealing with Body Fluid Balance and Radiotherapy. A number of chapters have been rewritten to provide for more recent concepts of pathology and management. The classification and illustrations are outstanding features. The authors have continued to record in footnotes names mentioned in the text with a line of biography, so giving the student interest and historical background.

In a work covering the whole range of general surgery there are bound to be

minor criticisms. Not everyone will agree with the management of tuberculous infection of lymph nodes of the neck. Aspiration and iodoform paste are reminiscent of the past although more modern therapy is included, and surely intravenous sodium sulphate is out-moded in severe renal failure, the result of crush injury? The treatment of lacerated wounds at page 10 would bear amplification. Immediate suture after excision might be modified by warnings. Post-traumatic swelling of tissues may complicate limbs encased in plaster and the necessary safeguards might have been outlined.

A Short Practice of Surgery can be recommended to the undergraduate and general practitioner and to those revising their surgical knowledge for examinations. As a single volume, like many of the other textbooks, it is heavy—a formidable missile. The reviewer has some volumes of the 8th Edition which was brought out in parts and these had the advantage of lightness and portability, which are valuable assets to those of us who are frequently on the move.

J. H.

IDEALS IN MEDICINE: A Christian approach to Medical Practice. Edited by Vincent Edmunds, M.D., M.R.C.P. and C. Gordon Scorer, M.B.E., M.D., F.R.C.S. London: Tyndale Press, 1958. Pp. 192+viii. Illustrated. 12s. 6d.

This collection of essays is intended to give the contemplative young doctor a critical appraisal of ethical problems by doctors writing from a Christian standpoint. The book contains a useful historical sketch and a very comprehensive bibliography. To the Scottish reader the book benefits by the inclusion of several quotations from Dr. John Brown's *Horae Subsectivae*. This is a book of considerable general interest.

P. L. E. W.

A TEXTBOOK OF SURGERY (2nd Edition). Patrick Kiely, M.D., F.R.C.S. London: H. K. Lewis & Co. Ltd., 1958. Pp. 1158+x. Illustrated. £3 3s.

The second edition of this surgical textbook is a clear, concise and straight-forward account of modern surgical practice. The book is written primarily for the advanced medical student, but the junior postgraduate would be amply rewarded by studying its contents. The text is clear and readable and the illustrations are well produced and easy to understand. Controversial and advanced subjects have been adequately represented and the author has in places stated clearly his own preference for certain methods of treatment.

The surgical rarities and curiosities have been relegated to small print so that the student may easily follow the more important principles. In the chapters on specialised surgery, e.g., fractures and orthopædic surgery, and thoracic surgery, Professor Kiely has outlined modern practice satisfactorily from the student's point of view, but for the postgraduate more detailed reading of a standard work on these subjects is necessary.

There is no section in the book dealing with intravenous therapy alone. This aspect of modern surgical management is so important that it is felt that a summary of the present position would not be too advanced for inclusion in a textbook primarily designed for the final year student.

The author and publishers are to be congratulated on producing an excellent book which must be of benefit to the student and which contains a great deal of information for the junior postgraduate.

P. St. G. A.

Principles of Administration Applied to Nursing Service. Geneva: H. A. Goddard. 1958. Pp. 106. £1.

In 1954 the World Health Organisation convened an Expert Committee on Nursing Service Administration. Mr. H. A. Goddard was a member of this Committee; his special work is hospital organisation. He has put before the nursing profession some guiding principles of administration, much of which is common knowledge to those who already hold administrative positions. It could perhaps be read with advantage by those intending to take administrative positions in the future.

It would have no appeal to members of the Army Medical Services; few would feel inclined to wade through so much detail. The book is expensive for what it has to offer.

H. A. G.

Correspondence

THE ARMY MEDICAL SERVICES

From Major-General R. E. Barnsley, C.B., M.C. (Retired). Sir.

Major Gordon deserves the thanks and congratulations of the R.A.M.C. for his very interesting and lively *Brief History of The Army Medical Services* published in your October issue.

In tracing the story of our medical services back to 1345 it is plain that Major Gordon has primarily those of the British Army in mind, but there seems to have been an army in Britain some 1300 years before this whose organisation had much in common with that of our army of today.

In the Journal of August, 1903, Captain Howell gives an interesting description of this organisation based on the researches of Sir James Simpson.

The army of the Roman occupation consisted of Legions and each legion contained ten Cohorts, each cohort consisting of some 700 men. It is attractive to think that the Medicus Legionis, or head doctor to the legion, may have corresponded to our A.D.M.S. of today and that the Medicus Cohortis to an S.M.O. Brigade. We learn, too, that medical men were divided into two grades, the Medicus Clinicus and the Medicus Ordinarius—surely the forerunners of our specialists and general duty medical officers of today!

A memorial tablet to one of these "ordinary" M.Os., Ancius Ingenius who died at the age of twenty-five, still exists in Hadrian's Wall at Housesteads in Northumberland. The article also gives details of the typical lay-out of a Roman encampment which always contained a Valetudinarium, or camp hospital, under the administration of the Quartermaster-General's Department.

In his Treatment of the Wounded in War George Wilkinson wrote: "In the

provision and organisation of an army medical service... Imperial Rome was more advanced than were the nations of Europe down to the 17th or 18th century." One might even put it at a century or so later for surely much of the medical débâcle of the Crimea might have been avoided if Lord Raglan had had an organisation of the kind at his disposal with a forceful D.M.S. or *Medicus Legionis* at its head.

I am, etc.,

R.A.M.C. Historical Museum, Queen Elizabeth Barracks, Crookham, Hants.

R. E. BARNSLEY.

From Major-General f. m. richardson, c.b., d.s.o., o.b.e., q.h.s., m.d. Sir,

Did Major Gordon really expect to get away with a reference in this Journal to the wishes and biases of Wellington as "absurd"? Wellington—whom Wavell rated as possibly the soundest of all great commanders, and who surely earned support for Wavell's verdict from Army doctors for all time by the following piece of research. In his first week with his regiment, when only seventeen, he had one of his soldiers weighed in full marching order and then in his clothes alone, in order to compare the power of the man with the duty expected of him. It took us Army doctors about 170 years to think of repeating that young man's observations as the basis for our recommendations about the soldier's load.

The belief that Wellington was cold and callous dies hard, despite Sir John Fortescue's judgment that "he had actually an emotional nature which he kept, owing to early training, under so stern control as to forbid it any vent except upon very rare occasions"; and despite the abundant evidence of his distress about casualties, and so on. I believe that it is wrong to speak of Wellington's "anger" that transport should be used for the wounded. He had to use what transport he could scrape together, first and foremost, to attain his objective, without which the whole force could have suffered greater disasters. On many occasions his plans were conditioned by the inadequacy of the resources, especially in transport with which the Horse Guards provided him.

Proper siege equipment would have spared him his agony at Badajoz, where observers, including McGrigor, were shocked by the suffering in his face. A Q.M.G. of his own choosing and better commissaries could have spared his admirers the pain of his scathing, and perhaps unjust, outburst after the withdrawal from Burgos in 1812.

Anyone who will read the Autobiography and Services of Sir James McGrigor can see that this great medical officer received constant sympathetic and practical support from his formidable Commander-in-Chief.

I am, etc.,

Headquarters,
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F. M. RICHARDSON, *Major-General*.



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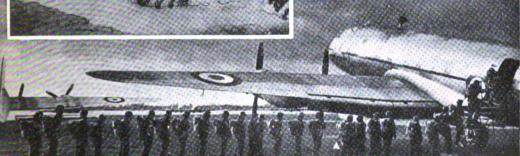
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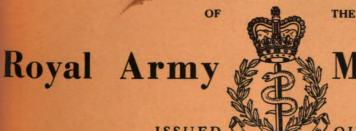
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OF



Medical Corps

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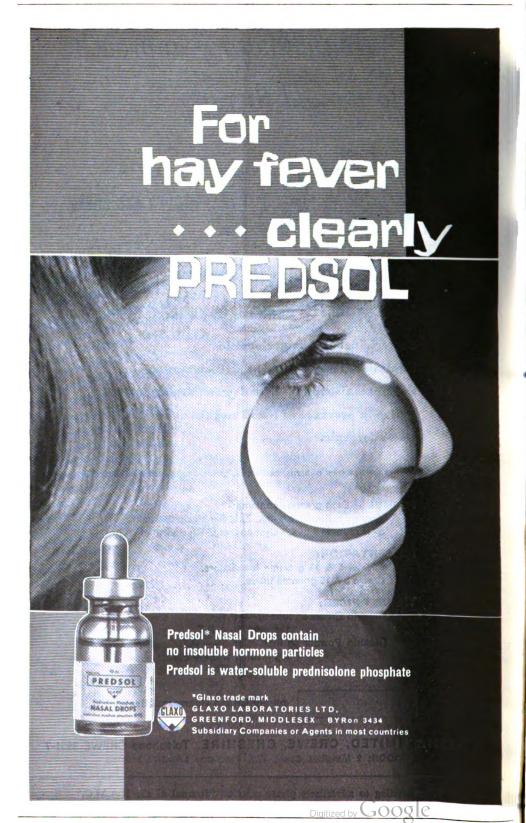
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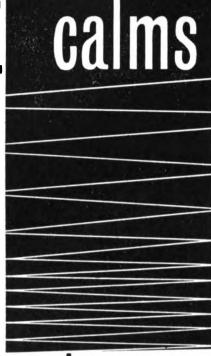
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RECRUITMENT FOR THE ARMY MEDICAL SERVICES

· BY

Major-General A. N. T. MENECES, C.B.E., D.S.O., M.D., M.R.C.P., D.T.M. & H.

ONCE again the British Army is undergoing change; by 1963 a volunteer all-regular army of 180,000 will come into being. In spite of great developments in electronics, ballistic missiles and space travel, the most important weapon of war still remains man himself. The soldier (particularly the infantryman) will still dominate the battlefield.

The future all-regular highly professional army will make greater demands than ever on the Army Medical Services. The increased health hazards which accompany the handling of missiles, electronic equipment and possibly radioactive materials; the new approaches to traumatic and accident surgery, and the medical care of the greatly increased proportion of highly-trained specialists in all fighting and supporting arms, will demand both in peace and war, professional standards in army doctors, dentists, nurses and medical technicians, second to none, a corps d'élite.

In an era of full employment such as at present, with the wide range of attractive civilian technological apprentice schemes and career patterns, recruitment for the Army is competing against heavy odds, calling for a special approach and techniques. Although pockets of unemployment exist (the unemployed are in the majority those without profession or craft) the problem facing youth today is of choosing rather than finding employment.

It may be opportune to consider what personnel the Army Medical Services require; whether such individuals are available for recruitment; what are the views of contemporary youth on the armed forces as a career; whether male nursing is popular in the United Kingdom today; what are the views of parents and other relatives towards careers in the services and finally how can recruits be attracted to join the Army Medical Services.

What Personnel do the Army Medical Services require?

A peace-time cadre of doctors, dentists, nurses and medical technicians and auxiliaries (e.g. male nurses, operating theatre technicians, radiographers, physiotherapists, laboratory technicians, hygiene personnel, etc.), with professional qualifications and skills equal to their civilian colleagues is essential.

To these professional skills must be superimposed training in the operations of modern war; the ability to be flown at a few hours' notice in medical support of a force involved in active operations anywhere from the Caribbean sea to Korea; in temperate or tropical climates; in cold, limited or global nuclear warfare.

The requirements are for individuals with high levels of intelligence, mental and physical robustness, powers of leadership, displaying a deep interest in the medical sciences. That such individuals exist is proved by the superb achievements of the medical services in recent years in Malaya, Korea, Suez, Muscat and Oman.

Are adequate Personnel available for Recruitment?

The rise in birth rate in the years following the war is producing the so-called "bulge." This commenced to be felt in 1958 and by 1962 there will be 929,000 school-leaving boys coming on to the labour market.

In civilian industry although there is no lack of applicants, promising boys leaving school eager to learn a skilled trade, there is a serious shortage of apprentice places available. In London for example there are two applicants for every vacancy; in the industrial north such as Lancashire, the position is even worse. During the next few years there is likely to be a surplus of first-class apprentice personnel. A carefully planned campaign to bring the R.A.M.C. Apprentices School with its careers prospects, to the notice of potential medical auxiliaries and technicians, would enable selected applicants to join the Army Medical Services at apprentice age.

What are the views of present day youth on careers prospects in the Army?

From information gained by careers conventions, army schools liaison officers, and information offices, it is clear that there is no hostility towards a service career but a marked lack of knowledge on the part of parents, schools careers masters, and youth employment services, concerning service careers potentialities. Many seem quite unaware of the fact that the army educational advantages, pay, allowances and privileges together approximate to civil life and in many cases exceed them.

In particular visits to army information offices have made it clear that in the past the unique careers prospects of the Army Medical Services have not been given the same emphasis as those appertaining to the arms and supporting corps (Royal Engineers, Royal Corps of Signals, etc.).

The youth of today is clearly interested in the medical sciences. A recent

survey of school-leaving boys showed the following answers to the question of what constitutes the most important field of human activity today*:—

				Public school boys %	Grammar school boys %	Technical school boys %
Medicine				18	28	21
Science				20	22	26
Religious or V	Velfare	Work		30	17	15
Industry				12	12	15
Politica				6	11	12
A -to	•••			5	6	3
Business				6	2	6
Armed Forces				2	$\bar{2}$	5
Sport	•••			1	1	1

It is significant that medicine and science occupy the two most popular places amongst school-leaving youths. Again it has often been alleged that nursing is not popular amongst men in the United Kingdom. This is quite untrue. In England, Scotland and Wales alone, over twenty thousand men have voluntarily taken up nursing as a career. At mid-summer 1959 the total numbers of male state registered nurses were as follows:—

Male	S.R.N.	General	•••			7,378
,,	,,	Mental	•••	•••	•••	10,816
,,	,,		Defective	•••	• • •	1,952
,,	,,	Fever	•••	•••	•••	72
			Total		•••	20,218

Nursing in the army covers a much wider field than any civilian counterpart. To all the latter can be added the nursing of traumatic, accident and combat injuries, the nursing of tropical conditions, training in mass casualty techniques, nursing under field conditions in all parts of the world, and finally the nursing of cases in transit by air or surface means.

Information about army nursing career prospects must be disseminated more widely than hitherto.

What are the views of relatives of potential recruits

Parents still exercise very great influence on their children in the choice of careers. A recent questionnaire sent by a youth employment authority to a random sample of 200 parents, showed that 85 per cent showed a detailed interest in their sons' choice of a career.

In another survey carried out to assess motivation amongst youth in selecting careers, the question was asked: "Who do you think has been most helpful to you in deciding on a career"?

[•] In some cases more than one item was selected, and in other cases no choice was made.

	Most help	Lower	Upper
	given by	6th Form	6th Form
Public school boys	{ Parents School Masters	45% 19%	47% 20%
Grammar school boys	{ Parents	35%	32%
	School Masters	27%	34%
Technical school boys	{ Parents	17%	29%
	{ School Masters	65%	59%

The answers given by school-leaving youths were:-

In addition to information concerning R.A.M.C. careers potentialities and details of the R.A.M.C. Apprentices School being disseminated amongst parents and youth employment and schools liaison officers, organised visits by parents and Y.L.Os. to the Depot and T.E. R.A.M.C., and the Apprentices School as frequently as possible will be of value.

Any recruiting campaign must also recognise the greatly increased proportion of young men who are either married or engaged. Accurate up-to-date information on facilities for married families at home and overseas, educational facilities and amenities, etc., will be essential to "win the wives."

The increasing influence of dependents on potential apprentices and recruits must not be underestimated, but must be influenced in favour of the service by a clear exposition of R.A.M.C. careers prospects, educational advantages, pay, allowances and privileges.

How can youth be attracted to join the Army Medical Services?

The ideal job may be defined as the one in which you get paid for doing something that you would want to do anyway. How can modern advertising techniques be used to assist recruiting for the Army Medical Services? Modern advertising is based upon different techniques of persuasion. Somebody with something to sell wants to persuade somebody else to buy. Both seller and buyer are human beings with varying motivation (frequently subconscious), prejudices and degrees of rationalisation.

If these principles are important for selling articles of merchandise how much more important it is when persuading youths to take up service careers for the best years of their lives. Youths of today want variety and adventure, to move about and see the world, to deal with people in jobs that are clearly worth doing, and where they feel that they are needed. Careers in the Army Medical Services can satisfy all these requirements, but how can these opportunities be brought to the notice of contemporary youth?

The main channels of communication between the Army Medical Services and potential apprentices or recruits are:—

- 1. Internal recruiting.
- 2. Liaison with parents, schools careers masters, youth employment authorities, appointments boards, etc.
- 3. Visits by parents, school masters and Y.L.Os. to the R.A.M.C. Apprentices School, and the Depot and T.E., R.A.M.C. and R.A.D.C.

- 4. Advertisements in the Press (both national, and provincial).
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- 10. Sound broadcasting.

To evaluate the respective merits of these different media would require separate study. But recent recruiting experiences have shown that the most potent recruiting agent today is the contented officer or soldier, the one who enjoys his working and living conditions and career prospects, and who is anxious to fire other people with his enthusiasm. No other medium of communication can beat the personal impact of an enthusiast; in the words of Newman, Cor ad cor loquitur.

Methods 2 and 3 have been discussed above; of particular importance are visits to medical units, hospitals and the R.A.M.C. Depot and Apprentices School by parents, schools careers masters, youth employment and schools liaison officers, etc.

Advertisements in the Press: these are controlled by the Director of Public Relations at the War Office. Whilst advertisements in the national dailies of specific arms, corps or services may stimulate recruiting, "local boy" stories in newspapers restricted to certain provincial areas such as the Birmingham Post or the Liverpool Echo, etc., describing the experiences, adventures and life of officers or soldiers from the local town, can evoke deep interest in service life and have a recruiting value. Publicity must be persistent and constant. The soldier likes to see himself in print.

Army Information Offices are situated on main thoroughfares, their display windows are seen by thousands of passers-by each day. It is essential that the staffs of A.I.Os. should be adequately briefed with up-to-date information relating to the Army Medical Services. Attractive and informative hand-outs covering only the Army Medical Services should be available in adequate numbers; it is not sufficient to have omnibus pamphlets in which the Army Medical Services are relegated to small paragraphs.

Military exhibitions, tattoos, military bands, etc. Although modern efficiency experts decry tradition, throughout the history of warfare, military symbols have moved men to perform outstanding feats of bravery and endurance. The public still responds to martial music, bugles, pipes, and drums; on numerous parade grounds, military music and ritual have helped to evoke the esprit de corps which gives a unit a soul.

Never has there been greater need for the Army to use its traditional tools for motivating men. Every opportunity should be taken of inserting a stand

portraying the Army Medical Services into local exhibitions. Part of this stand should include historical items, the superb series of winners of the Victoria Cross, and the achievements of the Army Medical Services throughout British military history.

Posters (static or located on transport, escalators, etc.). Posters function as a persistent reminder of goods and services. Posters should be designed to attract attention, to influence the mind of the viewer, and to persist in his memory with pleasant and worthwhile associations; who can ever forget the famous First World War poster, a portrait of Lord Kitchener accompanied by the slogan "Your Country needs YOU!"

Broadcasting and television have now become part of the very mental air we breathe; these fundamental information and entertainment services have become a stable element in the normal life of people both highly civilised and less mature. By them the majority of the population have undoubtedly become better informed about national and world affairs. Audience research has shown the intense interest taken in medical and scientific studies and in problems of the social sciences.

Is not "Emergency Ward 10" one of the most popular current features? How many people have been thrilled by "The Flying Doctor"? Would sound broadcasting and television be of value in recruiting for the Army Medical Services?

Whilst advertising is confined to commercial television and is prohibitively expensive, is there any reason why planned documentary television surveys of the Army Medical Services at work, in peace and war, should not be arranged?

Thousands of schools in this country are now using both sound broadcasting and television as ancillary aids to the curriculum. Would not a televised commentary on the daily work and life of the R.A.M.C. Apprentices School be a revelation and a stimulus to boys of school-leaving age?

Summary

It is submitted that adequate potential recruits for future Army Medical Services are available, but at the present time, parents, schools careers masters and youth employment authorities are not fully aware of the superb careers facilities they afford. The problem is essentially one of *communicating* this information to them. Whilst the most potent recruiting agent is the contented officer and soldier, the other means of communicating information must all be vigorously explored.

REGIMENTAL DOCTORING IN A BATTALION OF THE KING'S AFRICAN RIFLES

BY

Captain C. A. VEYS, M.B., Ch.B.

Royal Army Medical Corps

R.M.O., 6 K.A.R. Dar es Salaam, Tanganyika

THE following account is based on eighteen months' experience as R.M.O. of the 6th Battalion K.A.R. stationed at Dar es Salaam, Tanganyika, East Africa.

Dar es Salaam, the coastal capital of Tanganyika, is situated almost directly opposite Zanzibar Island. Its Arabic name means the "Haven of Peace" and despite the hustle and bustle of the modern world that centres round the new deep water berths of the harbour and the modern almost sky-scraper buildings in town, this title is still appropriate, particularly as one looks out from the yacht club across the calm waters of the bay at the many and varied boats that sway at their moorings.

This Haven has a colourful mixed population of several races. There are about 4,500 Europeans; 25,000 Indians and Pakistanis; 2,500 Goans; 1,500 Arabs and an African population of approximately 93,000. Needless to say this very cosmopolitan and multi-racial group live in smooth harmony together.

From June to September the climate though tropical is delightful with sunny cloudless days and a gentle breeze followed by cool nights. It can be very hot and humid from November to March when the heavy rains bring welcome relief. The average mean maximum and minimum temperatures are 86° F. and 71° F. respectively.

The prevalent endemic disease is malaria, exclusively malignant tertian in type. All military personnel and their families on station take a prophylactic anti-malaria drug (paludrine) as well as observing such other preventative measures as the use of nets, repellant, long sleeved clothing and so on.

Here where P.U.O. is a diagnosis because of the many different types of virus fever not yet recorded in the literature, a unit R.M.O. might record a pyrexia of 106° F. one evening and find the same patient normal next day.

Clinical material provides a wealth of interest such as malaria, leprosy, filariasis, relapsing fever, the dysenteries, tuberculosis, poliomyelitis, bilharziasis, sickle cell anæmia, all types of venereal disease and many others, all met in the course of normal everyday experience. For those with a desire to sharpen further their clinical acumen, diseases such as typhoid fever and smallpox can be seen in the civilian isolation hospital not uncommonly.

6 K.A.R.

The K.A.R. cantonment is situated some eight miles out of Dar es Salaam close by a very warm and buoyant Indian Ocean, refreshingly cool in the cold season, rather like taking a warm bath in the hot season. The camp is five years old, the quarters are modern tropical bungalows in design, and the officers' mess

with a superb view and setting on top of Observation Hill is probably the best in the command.

The European and African population of the station totals about 1,500. This figure includes wives and children both of Europeans and askaris. The picturesque colourful clothing of the bibis, their wide-eyed totos, the rhythmic drum beat and dancing on a ngoma (celebration) night typify this dark continent.

Thus the unit R.M.O. (in this station) is responsible for the medical health of about 1,500 persons and his work entails both the specialist aspect of military health and the medical and welfare aspects of a general practice. This, consisting of patients with two completely opposite extremes in health, living standards and background, fully occupies the R.M.O.'s time with malaria, midwifery and measles, dealing in drains, "devilry" and diseases. However the work is more than interesting and the experience gained is invaluable.

Recruiting

The medical standards for a potential recruit are very high and only those completely physically fit are acceptable. Normal vision and hearing, good muscular co-ordination and development, and a minimum standard of height and weight are all necessary if the raw recruit is to complete his strenuous basic training satisfactorily.

It is remarkable how quickly recruits evolve into trained askaris. Recruiting is not done locally but out on recruiting safaris throughout Tanganyika. These safaris take place two or three times annually.

Necessarily the medical examination for entry is a very thorough one and includes a routine X-ray of chest, examination of urine and so on. The chief causes for rejection on medical grounds, apart from obvious physical defects are markedly enlarged spleen, umbilical hernia, albuminuria (mainly due to bilharziasis), chronic otitis media, and respiratory diseases (often tuberculosis). Other causes are corneal scarring and especially extensive pre-tibial scarring which results in papery-thin healed skin that breaks down easily. Poor muscular co-ordination is common especially the inability to close one eye.

The medical aspects of recruit training are those that result from an adaptation by the recruit himself to a completely regular and strenuous way of life, quite foreign to his nature and experience to date.

The regular food, the diet less bulky but more nutritive than before, soon fills out any hollows but it gives him dyspepsia and diarrhoea; his boots cause blisters, moist feet and tinea; his clothes raise a prickly heat rash, but all these discomforts occur only at first.

The condition of a recruit at the end of training is superb in comparison with that on entry. An average weight gain is ten pounds and he goes back to his village on leave, proud and ostentatious over his new statistics and status.

The askari

The trained soldier or askari is often a slightly built but muscular man some 66 inches high and weighing 140 pounds. He has an unusual sense of humour,

shown at its best when his fellow is in a predicament. His character is a likeable one and he is a fine soldier to train and work with. His face and body may still be rather extensively marked with tribal decoration, particularly his ears whose lobes mechanically stretched might reach almost down to his shoulders, were it not that they are discreetly wound round the rest of his ear for anchorage.

Tribal removal of teeth is common, generally the upper or lower incisors. One tribe, the Jaluo, do this, it appears, in order that a potent herbal medicine can be poured down the permanent gap thus formed in all circumstances. For the patient the disease of practical importance is the affliction with the "fit" when the mouth is clenched tight. This practice of removing teeth may have been the primitive forerunner of our artificial air-way, but nobody can remember the name of the witch doctor who first thought of it.

The African is very proud of his or her personal appearance as the following story indicates. The African R.S.M.'s bibi was involved in a difference of opinion with another bibi. As a result of their exchange the former suffered the indignity of having her pendulous left ear lobule badly torn, so that the two ends hung down rather like tassels. Three days afterwards with her wounds partially healed she sought medical advice. The wounds were allowed to heal completely then re-incised and the two ends stitched together again. As there was not much tissue left to join, the ear healed giving an almost normal appearance. She is eminently satisfied and pleased with her newly acquired beauty and is now insisting that the other side be trimmed down to even things up!

The askari has firm faith in his medicine (dawa) and believes that an injection will cure all; even his inoculations are readily accepted in the belief that great strength is thereby imparted by this "white magic."

There are those, however, who still believe very much in "black magic," and the following three cases are interesting in this respect. An African clerk patiently underwent many treatments for alopecia and then politely but adamantly stated that his hair would not grow until the curse had been removed by his village medicine man, and the necessary herbal ointments applied. He went on leave and returned cured!

Two other cases are concerned with "devilry." An askari rifleman requested permission to take his wife back home to her village because she was possessed by a devil, it being well known that she came from a family possessed of devils which were handed down from one generation to the next. She was sent home and subsequent exorcism of the migratory devil was successful.

Finally there was the case of an askari who was possessed by a violent devil. One morning this devil after chasing the soldier all round his quarter, bit him on the arm. He reported special sick very out of breath, nursing an imaginary wound and complaining of pain all over the body due to the poison of the bite. Both for the medical officer's and the patient's peace of mind the treatment prescribed was two A.P.C. tablets and a gentian violet dressing to the non-existent wound.

With cases of this kind, provided that malingerers are sifted out, it is important

that genuine requests for witch doctor therapy are given a fair trial. These cases are few but experience shows that they do not otherwise do well on "white magic."

Medical aspects of normal routine

Despite the unfavourable climate the fitness and health of the troops remain generally good. Military training and hygiene are the two most important factors contributing to this.

The African families however, clinging stoically to their more primitive ways and culture, derived from their dwelling together with their livestock in simple huts of mud and sticks, provide most of the medical problems. Vitamin deficiencies and diseases resulting from bad hygiene are most commonly encountered. An African mother invariably breast-feeds her infant, who remains permanently slung to her back and is fed on demand. *Totos* up to nine months do well, but because breast feeding is very prolonged and their diet is a poor one anyway, it is a question of the survival of the fittest subsequently. Great advances in this respect have been made through the institution of the Battalion Welfare Clinic where advice is freely given and supervision maintained.

The askari trains hard and is well adapted to the hazards of sun and climate. During battalion route marches which the unit R.M.O. accompanies, liberal but controlled fluid intake and extra salt in tablet form is taken. Company or platoon groups on training are usually accompanied by a nursing orderly with medical haversack containing first-aid dressings, etc. A snake-bite set is also taken. Although there are some deadly poisonous snakes at large, such as cobras, puff adders and mambas, snake-bite is uncommon because snakes have acute hearing and usually take evasive action.

The African, very much of a walking race, can march long distances. He never wears a shirt on marches, seems immune from sunburn and the chafing of the rough webbing of his equipment. His marching song has a wonderful lilt and tune, characterising his inborn gift of rhythm. The commonest injuries received on training are fractures of the leg and collar bone, and internal derangements of the knee.

Sick Parade

This averages about fifteen daily, and is roughly the accepted two per cent of numbers. There has never been no attendance, and like any unit the attendance is high on Monday mornings and on the day of the R.S.M.'s parade.

True defaulting is rare, but an exaggeration of alimentary dysfunctions, diarrhoea or constipation is common. Symptoms relating to his bowels are of a serious nature to the askari. His simple but biased belief sometimes blinds his common sense as is illustrated in the following tragic story.

A ten-day-old baby was brought to the M.R.S. quite rigid and grimaced with neonatal tetany, which it appears had been present for several days. The complaint of the parents was only that the child had been constipated for two days and it was still this that worried them, even though the true nature of the disease was continuously explained until the infant died.

The total average malaria rate is 8 per month (for A.O.Rs. and families), but this varies seasonally. During the last 18 months there has been no case of malaria recorded amongst Europeans on this station. It may seem surprising that there should be any malaria at all in a potentially protected population. Remembering that mepacrine, which is the drug at present taken by all the Africans in camp, is a suppressive; that malaria commonly breaks through when there is a concurrent infection; that troops and families fail to take their mepacrine regularly on leave; and that it is not easy to survey adequately the taking of a suppressive drug by the families who do not parade like the troops, this incidence is understandable.

Venereal disease of all types is seen on sick parade, but gonorrhoea is most common. The V.D. rate is only about 4 per month. Colds, influenza, bronchitis, tonsillitis, otitis and conjunctivitis comprise the majority of those reporting sick, just as they do in the United Kingdom. Pain in the chest (lower sub-sternal in position) is a very common complaint for which no etiology has been found. Bacillary dysentery and bilharziasis are not uncommonly seen, amoebic dysentery is unusual. The remainder are either worms (all types), wounds or wind. This latter refers not only to flatulence but also to the elaborate way in which the African likes to describe his symptomatology.

Admission to civil hospitals and civilian liaison

There is no military hospital or ancillary diagnostic service for this unit. All these services are provided by the Government Medical Service, the Tanganyika Ministry of Health.

A very good and close liaison exists between the unit R.M.O. and the civilian doctors in Dar es Salaam. This is only maintained by continuous and frequent personal contact necessitating many visits, almost daily, into Dar es Salaam.

These visits are to the Ocean Road Hospital (European), Sewa Haji (African), Muhumbili Hospital (maternity), the Pathology Laboratory and the Medical Officer of Health. As much as possible, except surgical and infectious disease, is treated in the M.R.S. The askaris prefer to remain on station where they receive grade 1 hospital treatment. Early discharge, partly because of a bed shortage in the civilian hospitals is common, and the askari or his family complete their treatment or observation in the M.R.S.

All medical stores and equipment are obtained locally from the Government Medical Stores, and invaliding procedure is by a two-man board, the R.M.O. and a civilian doctor. A close liaison also exists with the civilian Red Cross, who provide the battalion with many excellent first-aid pamphlets in Ki-Swahili.

The blood transfusion service relies a great deal on the donor register composed of A.O.Rs., many of whom have given blood several times.

The M.R.S.

This is without doubt the battalion show piece and rightly so, because if the medical welfare of the askari is being well catered for, then all other aspects fall in line at a similar level.

The hospital half of the M.R.S. is composed of three wards. There are two six-bedded wards for A.O.Rs. and a six-bedded ward also containing three infant cots, for the African families. Other facilities include a well-equipped labour room with an obstetric bed, a minor operating theatre, sluice and laboratory. The latrines, showers and bathroom are all in separate but adjoining buildings. The M.R.S. is decorated throughout according to the latest colour scheme which is complimentary to the African's sense of colour.

As there is no other R.A.M.C. or European staff, a heavy load of administrative duty falls on to the shoulders of the unit R.M.O. and steals time that can be ill spared from his patients and other medical duty.

The African personnel consists of five nursing orderlies and a resident civilian midwife who also runs the families ward and assists at the Welfare Clinic. The battalion kindly lends a clerk. With such a small staff the problem is finding enough pairs of hands to run a dispensary, deal with the flock of bibis and totos that descend daily at 0930 hours for their consultations, and administer to the three wards.

Visiting groups of African students, civil servants and sub-chiefs are all tremendously impressed by the high standard of the hospital and its service, and are amazed that it is a free service. Dispensary treatment is given to the civilian employees, such as grass cutters working in the camp and to personal servants of the British households.

Patients admitted to the A.O.R. wards with diagnoses as previously indicated are usually short-term, but there is ample opportunity and provision for treating the long-term case such as rheumatic fever and petrol burns of the forearm, in co-operation, of course, with the hospital consultant. Such cases can and have been successfully treated in the M.R.S. and the askaris much prefer it this way.

The admissions to the families ward form a rather mixed bag. Apart from the midwifery patient, cases of malaria, P.U.O., respiratory infections, scabies, measles and chickenpox and not uncommonly miscarriages all receive in-patient treatment. The *bibi* is the beast of burden in the African household. She tills the *shamba* (fields), carries the heavy bundle of sticks on her shoulders and thus away from her toil is an unwilling and difficult patient to keep confined to bed.

Immunological procedures constitute a major part of normal routine work. The institution and maintenance of a full vaccination programme against smallpox, yellow fever, tetanus, enteric fevers and an increasing poliomyelitis programme for 1,500 persons require many long injection sessions. The bibi's reaction to the initial needle stab is interesting in that they cover their heads with their shawl in order to hide any facial expression. The older children fight madly, while the infants still clinging and asleep on their mothers' backs only wake up after it is all over.

Often in appreciation of "medical services rendered" the M.O. has found a live chicken in the back of his car or a hand-made reed basket containing a dozen eggs.

Midwifery and welfare

During the last seventeen months 157 patients were booked for delivery, of these 132 were seen in labour and the remainder were either transferred to another station with their husbands, or returned home to their villages for their confinement. This is a relatively common practice in Africa. Twenty cases were hospitalised and sent to the Muhumbili Hospital, because of some anticipated difficulty or complication developing during labour. Many of the conditions listed between hyperemesis gravidarum and post-partum haemorrhage in the text-books are seen, so that a sound knowledge of obstetrics is required. Ergometrine is used routinely and analgesics are not commonly necessary. The African bibi accepts the pain of labour, has a relatively easy one and her baby tends to be a small one. Only on coercion does she stay in the ward for three days post-partum. An interesting and more common minor pelvic abnormality is "straight sacrum," probably contributed to by her posture and stance resulting from the ever present child or load slung from her shoulders.

Welfare work, its meaning and voluntary aspect is not readily understood by the African. It is new to his culture, but is now rapidly becoming part of it. An excellent welfare clinic is held weekly for African families. It embraces the post-natal care of the mothers and their infants and is the advice bureau where problems of feeding and weaning are solved. The medical officer's wife, a trained State Registered Nurse, assisted by some of the other wives does a great job of work in running the Colito Welfare clinic. It is from this clinic that the families really do derive most benefit. Quite often medical conditions are discovered, and thus therapy is instituted more promptly and surely than would otherwise have been the case. At the clinic a simple colourful shirt is given to each new infant booked in, regular weighings recorded, and issues of U.N.I.C.E.F. milk, cod liver oil, vitamin D and calcium tablets are handed out freely.

Relaxation

In this climate this is one of the most important aspects too often neglected, to his detriment, by the hardened second tour soldier. East Africa in this respect offers more than most places. Here in Dar es Salaam the sports of the sea, swimming, sailing, goggling and deep-sea fishing all abound. Throughout the rest of East Africa, the once-in-a-lifetime opportunity for game photography or hunting should not be missed. The luxury, excitement and adventure of a visit to the fabulous "Treetops Hotel" can never be forgotten. This is a land of sunshine and colour photography.

Past, present and future

In conclusion, and looking back over the last eighteen months it is interesting to note what has been achieved, and what might be further achieved by future R.A.M.C. officers.

The most important achievement has been without doubt the establishment, where none previously existed, of a doctor-patient relationship between the African family and their European medical adviser. It is a complete breakaway

for the shy, simple *bibi* to come forward with personal medical problems, such as infertility, to a foreigner of the opposite sex. A lot of the credit must go to the African nurse-midwife who has acted as the indispensable mediatrix. The introduction of this post and the provision of full midwifery and other facilities in the families ward are all major advances.

The complete redecoration of the unit M.R.S. incorporating the latest in colour schemes, and the provision of new bed screens, individual overhead lamps, formica topped tables, are all improvements that have resulted from opportunity and progress.

The introduction of a complete ante-natal clinic with documentation and routine laboratory investigation comparable to that at home, has come about because the present medical officer has had a particular interest in this subject. It is hoped that a successor will continue this and introduce further innovations.

For the future, it is hoped to blood group every African soldier and then to encourage him to join the donor list; to pass the regimental stretcher bearers through the Red Cross first-aid certificate; and possibly to embark on a small research project, proving or disproving that on normal dosage régimes of antimalaria drugs, enough of this passes through the mother's breast milk to protect her infant adequately.

Although this description has been of one particular K.A.R. station, it is a fair assumption that the others are for the most part similar. Perhaps then this article may give a better idea to those others, who, like myself at one time, knew little of a most rewarding and personally satisfying work with the K.A.R.

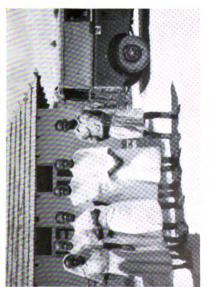
My thanks are due to Lieut.-Colonel T. A. Pace, O.B.E., A.D.M.S. East Africa Command for his suggestion that this paper should be written in the first place and for his advice in its preparation.



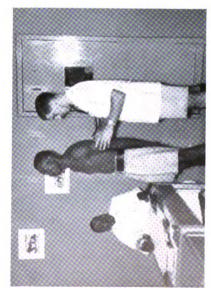
Toto being weighed



The Askari



The M.R.S. Staff



Sick Parade

A.O.R. Ward



R.A.M.C. RECRUITING—A WINDOW DISPLAY

BY

Lieut.-Colonel G. B. HEUGH, M.R.C.S. Royal Army Medical Corps

As the era of National Service nears its end, the Army as a whole is having to think more and more of recruiting from the general public. While the contented soldier will always remain the best recruiting agent, we must, among other methods, compete with civilian career prospects in the field of advertising to a much greater extent than hitherto. The corollary to this is that our advertising methods must be right up to date and must be continually kept up to date.

As a general rule, any advertisement must be bright and attractive enough to catch the eye of the passer-by, and its content must be sufficiently interesting to hold his attention long enough for its message to get through. At the same time this message must be as brief and clear as possible.

Perhaps in Western Command we have been stimulated to think more about this subject by the fact that the R.A.M.C. was allotted one of the major stands in the "Youth and the Army" Exhibition in Manchester last July. This was a ten day exhibition and it was felt that a more continued and persistent effort would be more likely to produce results in actual recruits. A form of window display which could tour Army Information Offices throughout the Command was decided on as the first line of approach, and the following is a brief description of the display which is now on view in the Command (see Plate facing this page).

First, the "eye-catcher": lights and moving objects are the things most likely to catch the eye, and both types of attraction were used in the Manchester Exhibition. For a window display it was considered that movement has more possibilities than lights. The idea used in this display was borrowed from a housing exhibition in which wallpapers were displayed on vertical prisms which could be pushed round. A little ingenuity and a lot of help from 12 Command Workshops, R.E.M.E., resulted in a series of prisms rotated slowly by a small electric motor. Nine prisms are needed to show the main trades of the corps, and each prism on its one foot square facets bears three pictures of tradesmen at work, one trade to each prism.

These prisms are incorporated in three linked panels four foot wide by five foot high, standing in open U formation, the angle of one to the other depending on the size of window available. Having put across one of the main attractions of the Corps, its interesting trades, in this way, the question remained: what to show in the rest of the panel space below the trades—pay, promotion, travel, sport, or what?

We considered that one of the attractions which the R.A.M.C. can offer in greater degree than other branches of the Army is the fact that training can lead to many civilian qualifications which will be of value after a man's army

service. The various societies and associations were therefore approached and all kindly supplied copies of their certificates or diplomas. These were mounted on one of the panels entitled "Passports to Success" with a very brief explanation of their significance.

The fact that we offer a progressive career in common with the rest of the Army is important, so another panel entitled "A Profession with a Future" bears a pictorial presentation of this fact in the form of badges of rank, including commissioned rank, mounted on a series of rising steps.

The third panel is aimed at countering the general idea that there is something unmanly about nursing and its allied professions. It bears the title "A Man's Life" and shows photographs of sporting activities and R.A.M.C. men in their war-time roles.

The whole display is surmounted by the Corps badge and title, and the floor space in front of the panels is occupied by lettering in relief form with the message "Win a Diploma in the Royal Army Medical Corps."

For the style and composition of the display and for the actual production of the photographs, captions, and general setting we are deeply indebted to Colonel R. G. W. Ollerenshaw, Q.H.S., T.D., B.M., Officer Commanding 7 (Manchester) General Hospital, T.A., and Captain J. Kilshaw, non-medical officer 126 (Lancashire) Field Ambulance, T.A., who in their civilian capacities are Director and Assistant respectively of the Department of Medical Illustration of the Manchester Royal Infirmary. Their advice and their practical assistance were invaluable.

What effect such a display will have on recruiting can never be accurately assessed, but we are convinced that more and more of this sort of advertising is required, and if these notes should stimulate others into producing better ideas their aim will have been achieved.

OMAN 1958

BY

J. BROTHWOOD, B.A., M.B.

Formerly Captain, Royal Army Medical Corps

BEFORE I went to the Oman it was just an unusual word which had once helped me to finish off a corner of a crossword. I had not appreciated its strategic importance at the entrance to the Persian Gulf, nor its potential as a possible source of oil.

The country consists of a narrow fertile littoral, a desert hinterland and a fertile mountainous area 100 miles inland—the Jebel Akdhar range. The chief towns are Muscat on the coast and Nizwa which is situated at the foot of the mountains. Communication other than by air is by lorry over rough desert tracks where an average of 10 miles per hour is a good speed.

Politically the Sultan of Muscat has ancient ties with the British. In internal

affairs the country has until recently been ruled in two parts. The coastal area has been governed by the Sultan, the mountainous area by the Imam who, although strictly a religious leader, exercised considerable political power also. This arrangement had been satisfactory for decades. Recently, however, it became important that the Sultan should establish his sovereignty over the mountainous inland area. The reason for this was the possibility of oil being found in the Oman. The frontier with Saudi Arabia had never been clearly demarcated, and after the Burami Oasis incident of 1952 it became clear that Saudi Arabia was not above advancing its territorial claims by use of force. Consequently in 1955 the Sultan made a tour of his country, during which all paid homage to him. Hardly had he returned to Muscat, however, when the hill tribes began military training, backed by Saudi arms and ammunition, in order to gain control of the mountainous area. In 1957 they captured the town of Nizwa and the Sultan appealed for British help, which drove them back into the mountains. When the British withdrew the rebels again started guerilla tactics, mining the roads and mortaring the outposts of the Sultan's Armed Forces. In November 1958 the 22nd Special Air Service Regiment was brought from Malaya and helped to defeat the rebels and drive them from the mountains.

This was the background to the three months of September, October and November 1958 which I spent at the base camp of Nizwa. My duties there were to look after a detachment of British troops, 50 strong in all, and 350 Arabs led by seconded British officers and Royal Marine sergeants. The medical problems were of three sorts—administrative, hygienic and clinical.

The administrative problems were those of long distances and poor communications. Bahrain was 800 miles away. Drugs and dressings and fresh rations all had to be brought in by air twice weekly. Any urgent casualty required a special plane. As night flying was not allowed in the mountains this might have resulted in a delay of eighteen hours before a person was got to hospital. Consequently when the S.A.S. operation was planned it became imperative for surgical cover to be available on the spot, and a Field Surgical Team was formed in England and sent out by air to Nizwa. In addition, helicopters were available for transporting wounded from the mountains to the F.S.T., thus avoiding the "shocking" journey over desert tracks. Fortunately casualties were extremely light.

The hygiene problems involved were considerable. The crux of the problem was that British and Arab troops shared the same camp, and while efforts were made on the British side to dispose of waste food and excreta properly, no effort at all was made on the Arab side. It was obviously essential that the whole camp should be as clean as possible as it is useless for one half of the camp to be clean and the other not.

Communal health problems resolved themselves into three: (1) Water purification; (2) disposal of waste food; (3) the prevention of soiling of the ground with fæces and urine.

When I arrived I found that water was being superchlorinated for the British other ranks only. Curiously, the officers' and sergeants' messes thought

it was unnecessary. I insisted at once that all water coming into the camp should be sterilised. This met with opposition from officers in charge of Arab troops, but I advised them to say that the water had been treated in order to increase the virility of the Arab troops (a subject near to every Arab's heart). As it happened, no complaints were received from the Arab troops and I doubt whether they even knew that the water had been chlorinated.

The problem of water supply was difficult. Two sources were available—a well in the camp and the *falaj* above the town of Nizwa. The former, although a tempting source, was rejected firstly because it would not quite supply the needs of the camp and secondly because it was not proof against contamination either via the soil or by objects thrown into it.

I went to see the water point and was horrified to see an Arab squatting in the falaj and washing himself ten yards above it. This was in spite of all assurances that the water was clean, Arabs never washed in this particular spot, and so on. I found that more nonsense was talked about pure water by educated people than on any other subject.

Disposal of waste food was an easier problem. Everyone agreed that it should be done properly. For the British troops incinerators were built. The Arabs continued to throw their *chapattis* anywhere, but a squad of sweepers was formed to clear them up.

Deep trench latrines were used by the British troops, but the use of "desert roses" for urination had to be insisted on. The Arabs were a more difficult problem. Here again one was repeatedly told how clean the Arab was, how he always buried his stool with sand, how he never defecated inside the perimeter wire, and so on. However, a walk around the inside of the wire showed what nonsense this was, and I insisted that a deep trench latrine be built. I knew that not all would use it at first, but I felt the beginning of education was the provision of proper facilities.

The clinical problems encountered were those of heat, infective hepatitis, malaria, traumatic injuries, septic skin conditions, and those of dentistry.

It was extremely hot in Nizwa. On my second day there the thermometer reached 125° F. in the shade. However, the humidity was low as the sea was 100 miles away and the area mountainous. After a month the cool season began and the heat was less oppressive. No cases of heat exhaustion or heat stroke were seen. I was extremely apprehensive when anybody suffered from either a fever or diarrhæa or both, and I always felt that these people were in great potential danger. No air conditioning was available in the camp at that time. Sporadic infective hepatitis was a serious problem. In the initial phases differential diagnosis from heat exhaustion was difficult, as both show malaise, fever, and extreme apathy. Once jaundice appeared the diagnosis was strongly presumptive, malaria being the main differential diagnosis. The latter could be distinguished by the temperature chart. It was interesting to note that out of the five cases of hepatitis, four were officers and one was a sergeant. No cases occurred amongst the men. In view of the remarks about water purification (vide supra) this suggests that the virus of infective hepatitis might be suscep-

tible to superchlorination. I was only at Nizwa for three months and the incubation period of infective hepatitis is long and the numbers involved small, so no definite conclusion could be reached.

As regards malaria, this was no problem at all until late October when the weather became cooler. First a number of Arab troops complained of fever and malaise. The spleen was palpable in some of them, but they were not severely ill, presumably because they were partially immune. A week or so later the first case occurred in a British soldier who had failed to take his paludrine. Two weeks later a further soldier was affected. Again he had failed to take his paludrine. A daily paludrine parade was instituted and all sources of static water were covered, including a tank holding water for the showers, where larvæ were found. Officers were ordered to use mosquito nets. Troops were ordered to keep the doors of their mosquito-proof barrack rooms shut. No further cases of malaria occurred.

The traumatic injuries during this time were due to various agents, e.g., a fall off an armoured car producing a compound fracture of the femur; a land mine causing a virtual amputation at the ankle joint. The main problems were prevention of wound infection, and getting the patient to hospital as soon as possible for surgery.

Septic skin conditions were extremely common amongst the British troops and were due to several factors. First was the virtually universal infection of the feet with tinea, thus providing a source of secondary infection of wounds. Second was the failure on the part of the troops to clean and dress any slight graze or cut. Third was the extreme heat which caused the dressings to become soaked with sweat and thus unpleasant to wear, besides keeping the wound moist. However, wound healing was possible by attention to first principles, and I remember one man who had a second degree burn of his hand from cooking. A Kramer wire was bent to form a cage round his hand and this was made fly-proof by gauze. The hand was dipped in a potassium permanganate bath for ten minutes three times a day, and his hand healed within three weeks in spite of being infected when the soldier first reported sick.

Dental troubles were not common amongst British troops, as most had had dental attention before leaving the United Kingdom. They were, however, quite a problem amongst the Arab troops. My predecessor had taken teeth out and I carried on his good work. I felt it important to do so as the alternative was a visit to Muscat and the soldiers would be away for at least two weeks. As any Arab soldier could point to one of several carious teeth in his mouth and say it ached, it was imperative to remove teeth in the camp to prevent considerable manpower wastage! I had a choice of three different dental forceps with which any tooth could be extracted.

Although I was not responsible for the local population, I saw them in their villages on many occasions. Their villages lack sewers, piped water and electricity. The people are very poor and badly nourished. The great majority suffer from trachoma, and it is common to see children of seven and eight virtually blind in one eye and losing the sight of the other from this preventable

disease. Tuberculosis is probably common but difficult to assess without bacteriology or radiographical studies. Leprosy in its more gross forms was rare, but those with it were segregated and provided for by the community.

I was struck by the lack of knowledge of first aid and in particular the dressing of wounds and cuts. It is still the practice there to daub all wounds with camel dung, which in turn results in gross sepsis. Antibiotics are unknown to the majority and maggot-infested wounds were common. I had particular admiration for Dr. Rahman, an Indian doctor, who was the only civilian doctor there, looking after between five and ten thousand people over a widely scattered area. His morning surgery consisted of between seventy and ninety people. Most of them placed great faith in injections of any sort and could be quite insistent in their demands for them.

This widely held belief in the healing power of any injection typifies the backwardness of the Oman. There is a great opportunity for the development of hospital services and preventive medicine. This was a most interesting three months in one of the most undeveloped and climatically hot countries in the world.

CONTROL OF PULMONARY TUBERCULOSIS IN THE BRIGADE OF GURKHAS IN MALAYA, 1955 TO 1958

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THE high incidence of pulmonary tuberculosis among Gurkha soldiers in comparison with British soldiers serving under similar conditions has been a matter of interest for several years. Many views on the possible reasons for this have been put forward, but much remains to be proved. Lack of knowledge of the incidence of disease in general among the civil population in Nepal is at present the main stumbling block. In time no doubt this will be removed.

Several likely reasons have been considered, and control measures instituted accordingly. A control scheme which is still developing has been in operation in Malaya since 1952. This paper relates to the period October 1955 to August 1958, when the author was Assistant Director of Army Health, Malaya Command, later Overseas Commonwealth Land Forces.

Morbidity

Hospital admission rates per thousand per annum for cases of pulmonary tuberculosis for the period 1948 to 1957 are given in Table 1.

		Gurkhas FARELF	U.K. Troops FARELF	U.K. Troops at home
1948	 	3.78	0.8	2.6
1949	 	3.44	1.0	1.3
1950	 	3.85	0.7	1.6
1951	 	7.28	0.7	1.4
1952	 	7.18	1.0	1.2
1953	 	14.82	0.6	1.3
1954	 	8.10	0.5	0.7
1955	 	5.24	0.6	0.5
1956	 	8.53	0.5	0.8
1957	 	8.60	0.4	0.7

Table 1. Pulmonary tuberculosis—admission rate per 1,000 per annum

The marked variations in the figures for Gurkhas are due, first to the increase in case-finding following the introduction of mass miniature radiography in 1951, and secondly to the irregularity of such surveys due to operational factors and technical problems. Bearing this in mind the average figure over the ten years is approximately 7.1 per 1,000 per annum.

Epidemiology

Various attempts have been made in the past to study the epidemiology of this disease. During recent years increasing information has become available from the results of tuberculin testing of recruits. Aspin (1947) carried out large scale Mantoux testing in Nepal on Gurkha recruits, and from the information obtained was able to calculate a percentage positive reaction rate for the various tehsils from which the recruits were drawn.

Percentage Number Number Percentage Tehsil positive 1947 (Aspin) tested positive positive Dailekh ... 14 64.3 12.5 Sallvan 5 3 15.3 60.0 35.7 14 Puithan ... 21.1 217 Palpa 110 50.7 21.5 (Gulmi) 38.3 (Palpa) 4 West ... 401 239 59.6 West ... 303 202 66.7 ... West 54 72.2 39 2 East 48 29 60.4 3 East 176 107 60.8... ... 4 East 148 96 64.9 5 East (Dhankuta) 471 300 63.7 ... 28 Ilam 21 75.0 Total Nepal 1,879 1,160 23.4 61.7 91.8 India 45 Total 1,928 1,205 62.5

Table 2. Source of recruits 1953-1955

A similar review has been made of the recruit intakes for 1953, 1954 and 1955, in relation to the villages, thums and tehsils from which they came. Testing had been done at the depot in Sungei Patani, Malaya, details of home addresses being supplied by the officer in charge of Gurkha records. Table 2 shows the findings, in comparison with those of Aspin.

From these figures it would appear that pulmonary tuberculosis is fairly evenly distributed throughout all the tehsils from which the recruits are drawn.

A further subdivision into districts and *thums* showed on the whole a similar incidence of positive reactors. *Thums*, equivalent to county districts, from which twenty or more recruits had been enlisted are given in Table 3 with the percentage of positive reactors.

Tehsil				Thum	Total	Number positive	Percentage positive
Palpa	pa Galcot		Galcot	20	8	40	
•				Rakhu	26	11	42
4 West				Payang Darbar	31	18	58
				Dangsing	26	14	54
				Ghara	34	16	47
			1	Mallatha	27	6	22
3 East			'	CHARLES I	66	37	56
Jisast	•••	•••		D J	43	26	60
4 East				771	20	15	75
T Last	•••	•••	•••	C1 - 1	80	51	64
5 East			1	Aut			
		• • •	•••	Athrai	20	15	75
(Dhan	ikuta)		ł	Chaipur	34	18	53
			1	Maiwakhola	65	43	66
				Phedap	63	36	57
			i	Panchithar	88	53	60
			i	Sabhavanattar	24	16	67
				Tomorikholo	36	24	67
				Taplainna	24	14	58
			- ;	Yangrup	60	39	65

Table 3. Incidence of positive reactors in Thums (producing 20 or more recruits)

A certain amount of further information was available relating to the villages within the *thums* listed above. Table 4 gives the incidence of positive reactors in villages producing ten or more recruits.

Table 4. Incidence of positive reactors in villages (producing 10 or more recruits)

Thum			Village		Total	Number positive	Percentage positive
Ghara	•••		Sikha		10	3	30
Chisankhu			Maidel Mukli		10	6	60
Sikkel	•••		Dilpa		21	13	62
		Ì	Chinamkhu		15	10	67
Panchithar	•••		Himanampa		11	6	55
Tamarkola			Hangdewa		11	5	45

Certain villages, from which two or more recruits came, were found to produce positive reactors entirely, while certain others produced all negative reactors. These are listed at Table 5.

Tehsil		Thum	Village Number all positive		Village	Number all negative
Palpa		Galkot			Sunpani	2
4 West		Ghara			Khibang	
		Mallajha			Histan Nangi Banskharta	2 3 2
3 East Chisankhu Rawadumre		Tekanpur Temene	2 2	Bagsila	3	
4 East	East Siktel		Khatti	2		
5 East		Maiwakhola	Yakteli Jhinalaba Tambe Santhe Lekwame Numlok Tumbangphe	6 2 4 2 3 3 3 2		
		Phedap	Thampula Aisne	3 2	Majhuwa Phumpha Simare Waipung	3 5 2
		Panchithar	Yangnam	3	Khesangboka Singgang	6 2
		Subha- yanatter Tamarkhola Taplejung Yangrup	Haluwa Tapethok Dokha Yangsimbe	5 4 2 2	Segaya	2

Table 5. Villages showing all-positive or all-negative reactors

Although the above figures are too small to be of any statistical value, it does appear that there might well be small isolated pockets in Nepal which pulmonary tuberculosis has not yet reached. The incidence of positive reactors differs widely from the findings of Aspin. This may be due to a variety of reasons. First, between nine and eleven years have elapsed since Aspin's investigations were made, and travel throughout the country has no doubt become more general. Secondly, Aspin carried out his tuberculin tests actually in Nepal. In the above series, tests were performed at the depot in Malaya, approximately three to four months after enlistment. Conversion from negative to positive may well have been brought about during that period, during which the recruit will have travelled from his home via India, and will have been faced with risk of infection *en route*. Thirdly, Aspin's technique of Mantoux testing differed from that used in the above series in that operational necessity caused

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the results to be read at 33 and 48 hours instead of at 72 hours after performance of the test, and this may well have given too low a reading of positive reactors.

The above findings are again borne out by a review of tuberculin testing of recruits and boys enlisted over the period 1951 to 1957, when out of 5,676 tested, 3,525 (i.e. 62.1 per cent) were positive reactors on arrival at the depot. Comparing recruits with boys, from figures available for the years 1952, 1953 and 1957, there is no significant difference between the percentage of positive reactors in the two categories. The findings are given in Table 6.

		Total Number Tested	Total Number Positive	Percentage Positive
Boys (age 14 to 17)		333	198	59.5
Recruits (aged 18+)	!	2.383	1.460	61.2

Table 6. Result of tuberculin testing of recruits and boys 1952, 1953 and 1957

Natural conversion during service has been studied from information obtained from the results of Heaf testing, carried out during 1957 and 1958 on serving Gurkha soldiers who had missed their initial test at the depot as recruits. This is set out in Table 7.

Ye	ears of	Service		Number Tested	Number Positive	Percentage Positive
0 (Recruits 1951-57)				5,676	3,525	62.1
1				170	132	77.6
2				146	115	78.8
3				91	80	87.9
4				60	50	83.3
5				253	200	79.1
6				159	120	75.5
7				109	93	85.3
8 9				528	472	89.4
9				827	759	91.8
10				136	127	93.4
11				133	123	92.5
12				74	71	95.9
13				127	123	96.9
14				116	111	95.7
15				106	. 104	98.1
16				53	52	98.1
17				77	76	98.7
18+				58	58	100.0

Table 7. Incidence of positive reactors in relation to length of service

Apart from a few anomalies, a steep rise in natural conversion seems to occur during the first nine years of service. After that the rate appears to slow down until 100 per cent conversion is found after 18 years.

A review of available records relating to 478 cases admitted to hospital during the period 1950 to 1957 showed that 73.1 per cent of these were admitted during their first ten years of service, 37.9 per cent being admitted during their fifth to tenth year. Details are given in Table 8.

Yea	rs of S	ervice		Total Number Admitted	Percentage	
0			•••	 169	35.4	
5				 181	37.9	
10				 106	22.2	
15	•••			 16	3.2	
20+	•••	•••	•••	 6	1.3	
Total				 478	100.0	

Table 8. Hospital admissions 1950 to 1957 in relation to length of service

The comparatively high proportion of cases admitted during the first ten years of service corresponds to the rapid development of natural immunity over the same period, as shown in Table 7, and is clearly associated with exposure to infection as a "new experience" during these years.

From the above tables certain conclusions can be drawn:

- 1. Nepal is by no means free of endemic pulmonary tuberculosis, and the disease is fairly evenly spread over the various *tehsils* from which recruits are drawn. There do, however, appear to be areas where infection may be minimal, and certain villages may well be entirely free of it.
- 2. The overall tuberculin-positive rate among males of the age group 14 to 18 years has been found to be 62.1 per cent on enlistment. The recruit intake contains an element from India, among whom the rate would appear to be, from figures available, considerably higher than among the residents of Nepal, *i.e.* 91.8 per cent in comparison with 61.7 per cent during the years 1953 to 1955.
- 3. There is clearly a risk of infection during service, as is illustrated by the rapid rise in natural conversion during the first nine years of service.

Sources of infection are as yet indefinite, but there are several likely ones. The change of environment, from the comparative isolation of a village in the hills of Nepal to that of a busy and populous depot in Malaya, involving a journey through India en route, is likely to subject the young Gurkha to risk of infection as a start. Both India and Malaya are known to have a high incidence of endemic tuberculosis and therefore contact with the civil population of either of these countries, however slight, does constitute a definite risk. The presence of undetected open cases among the civil employees and possibly some of the older soldiers in the depot and in units, is another likely source. The leave journeys to and from Nepal, which take place at three-yearly intervals, involve travel under somewhat strenuous conditions through populous and no doubt heavily infected areas.

Although the Gurkhas are a hardy race and generally maintain a high standard of physical fitness, the strain of jungle warfare and all it implies over a long period, which during recent years has kept them fully employed, may well be another contributing factor to the lowering of resistance to infection.

Points that would appear to merit further investigation are:—

- 1. Further studies of the incidence of the disease within Nepal itself. Tuberculin testing of recruits when they first appear at Lehra depot would probably give a more accurate picture than the results obtained at Sungei Patani some weeks later.
- 2. What is the true significance of a positive tuberculin reaction in relation to susceptibility to reinfection? As tuberculin test results are now graded by Heaf's method, a note of the initial degree of the positive reaction should be made in all cases presenting during service with active tuberculosis, to see to what extent the nature of the reaction indicates immunity.
- 3. Further studies should be made into the relations between Gurkha soldiers and the civilian population of Malaya, with a view to finding any possible correlation between the incidence of tuberculosis and that of any other social diseases, such as venereal disease.

The control scheme

The existing control scheme depends on the following sequence of events:

- 1. Full plate chest X-ray of all recruits on first enlistment, prior to embarkation for Malaya.
- 2. Tuberculin testing of all recruits at the depot in Malaya, and protection by B.C.G. vaccination of all susceptibles.
- 3. Routine follow-up of all persons who have received B.C.G. vaccination by annual tuberculin tests, followed by revaccination if indicated.
- 4. Routine follow-up of all persons by mass miniature radiography at intervals of twelve to eighteen months.
- 5. Notification of cases, and follow-up of all contacts of a case by mass miniature radiography at three-monthly intervals for two years.
 - 6. Isolation and treatment in hospital of all cases, for at least two years.
 - 7. Follow-up of ex-hospital cases for five years.

The scheme as far as is practicable, is applied to Gurkha families in Malaya as well.

Initial chest X-ray of recruits

By means of a full plate X-ray, taken on first enlistment at the depot in Lehra, India, all active and doubtful cases are eliminated from the draft before embarkation for Malaya.

Tuberculin testing, B.C.G. vaccination, and follow-up

As soon as practicable after arrival in the depot at Sungei Patani, Malaya, all recruits undergo a tuberculin skin sensitivity test. This has been the rule since 1952 and since the beginning of 1958 has included the wives and children of Gurkha soldiers as well. Formerly the Mantoux test was used, but now the Heaf multiple puncture test is carried out. The technique is briefly as follows:—

A suitable site, about a hand's breadth below the bend of the elbow is chosen,

avoiding any superficial veins. After cleansing the skin with spirit a small amount of purified protein derivative or old tuberculin, undiluted, containing 2.0 mg. per ml. (100,000 ITU) is spread as an even film over about one square centimetre of skin. The end of the Heaf gun, previously sterilised by flaming, is then pressed over the film and the six needles released by spring action. For adults, two millimetres' penetration is generally used. The arm dries in about half a minute, and no dressing is needed. By this method about twelve men per hour can be tested. The result is generally read seventy-two hours later. Positive results are graded as follows and are recorded accordingly.

1st degree—four or more palpably indurated papules.

2nd degree—when papules have coalesced to form a ring.

3rd degree—when there is a large plateau of induration.

4th degree—anything greater than the above.

Results over the period 1951 to 1957 showed a positive reaction in 62.1 per cent of all recruits tested.

Negative reactors, after confirmation of freedom from infection by chest X-ray, are vaccinated with B.C.G. This is given as soon as possible after the result of the Heaf test is known, unless the person concerned is known to have been in contact with an open case of pulmonary tuberculosis, in which case the Heaf test is repeated six weeks later. After vaccination, a further tuberculin test is carried out after six weeks. If the result is again negative a further retest will be carried out after another interval of six weeks, and a third if necessary eighteen weeks after the initial vaccination, before revaccination is performed.

The technique of B.C.G. vaccination is briefly as follows:—

Freeze dried vaccine, reconstituted with distilled water is used. Before use the vaccine is maintained at a temperature of four degrees centigrade or below by storage in a thermos flask containing ice. A site is chosen usually over the insertion of the left deltoid muscle, the skin is cleaned with spirit, and 0.1 ml. injected intradermally. Local reaction follows at the site of injection in ten to fourteen days, beginning as a small papule, increasing in size over two to three weeks, and ending as a small shallow ulcer which may persist for from three to four months. This is, however, generally painless and in no way interferes with the recruit's activities. All persons who have received B.C.G. vaccinations are retested annually and revaccinated if reversion to negative reaction is found.

It was found that by using the Heaf test in place of the Mantoux a high rate of conversion from negative to positive was detected, and during a period in 1956 100 per cent conversion within twelve weeks of B.C.G. vaccination was demonstrated.

Investigations showed that a large number of serving Gurkha soldiers, mainly those enlisted prior to the introduction of routine tuberculin testing in 1952, had never been tested, and it became necessary for unit medical officers to check through records and estimate the numbers involved. This was found to be approximately 5,000, and during the years 1955 to 1958 there has been a gradual completion of their tests. The difficulties in completion were

largely attributable to service exigencies, which limited the only available opportunity for such testing to the annual retraining period of approximately one month. As things turned out, this period seldom occurred at the expected time, and was more often an eighteen monthly interval than an annual event. Absence on leave, which occurs every three years for a period of six months and accounts for approximately 15,000 men at any one time, also slowed up the process of completion. A planned programme however has been drawn up, to ensure completion of testing by the end of 1958 of practically the whole of the Gurkha forces in Malaya.

The necessity for linking chest X-ray with B.C.G. vaccination is fully realised, and in no case is B.C.G. vaccination administered to a negative reactor without a prior chest X-ray to confirm freedom from infection.

Mass miniature radiography

Mass miniature radiography as a means of detection of early cases and for routine contact follow-up has been in use since the beginning of the control scheme. Initially, a lorry-transported portable equipment was used, but owing to the wear and tear involved in moving it on and off the lorry, in addition to its frequent carriage over rough roads, this particular equipment had become unserviceable by the end of the summer of 1955. In June 1956 a new set was produced, consisting of a Watson 90 KV/400 mass miniature radiography set permanently mounted in a Bedford articulated vehicle, with a generator carried on a three-ton truck. The vehicle has been painted white, to reflect light and maintain a cool interior.

The team consists of three radiographers, one of whom is a sergeant, and two drivers. Its rate of travel is reckoned at twelve miles in the hour. It can start working within thirty minutes of arrival in a unit, and can X-ray 300 persons per day at a comfortable pace. Clerical assistance is generally provided by the unit under review.

The team is as far as possible allotted to a particular area every three months, in order that major units undergoing retraining, static units, and families in the various garrisons can be reviewed. This service is not of course confined to units of the Brigade of Gurkhas, but covers all units and families in the Commonwealth Forces in Malaya. It is necessary for arrangements to be on hand in all areas to cover the domestic requirements of the team, vehicle maintenance, and, in the event of a breakdown, repair. The medical officer of the unit or garrison is generally relied upon to fix up all the necessary details to ensure a smooth passage for the team, together with a maximal attendance of military personnel and families.

Gurkhas are given a high priority in these surveys, and priorities are allotted in the following order:—

- (i) Contacts of cases due for surveillance.
- (ii) All those who have never had a routine chest X-ray.
- (iii) All those who have not had a routine chest X-ray during the past twelve months.

- (iv) All those due to leave Malaya on leave to Nepal after three years' service in the Far East.
- (v) All those who have returned from leave in Nepal within the last six months.
- (vi) Gurkha personnel due to return to Nepal on discharge from the army, during the next six months.

Members of families are included as far as possible in the above categories, with the exception, for technical reasons, of children under the age of five. Civilian employees in Gurkha units, particularly food handlers and domestic servants are also included in the survey.

A system of documentation exists to ensure that mass miniature radiography findings are recorded on personal documents, the miniature films being retained with personal records. Cases of active tuberculosis, other abnormalities and spoilt films requiring repeat X-ray are notified to the medical officer in charge of the case by telephone or priority signal by the radiologist responsible for reading the films. In order to avoid delay, any case with abnormal findings is promptly sent to the nearest British Military Hospital for full plate X-ray and admission if necessary. If there is any unavoidable delay between the receipt of the signal and admission of the patient to hospital, he is taken off all duties and isolated as far as is practicable. The aim is to get the case into hospital within seven days of X-ray. In addition to the use of signals and telephone, documentary follow-up is also carried out.

During the period June, 1956 to May, 1957 the team made eight major tours covering some 18,000 miles, and over 31,000 people of all categories were X-rayed. During the latter half of 1957 a second set was made available. Unfortunately during this period there was a series of breakdowns, accompanied by personnel shortages, which somewhat hampered activities. However, during the period July, 1957 to June, 1958 approximately 21,000 persons were X-rayed, which included 9,773 Gurkha troops and 4,029 of their families.

The results of mass miniature radiography give an interesting and valuable indication of the incidence of pulmonary tuberculosis among serving Gurkha personnel in comparison with British Commonwealth Forces as a whole. This is summarised in Table 9.

Table 9. Result of MMR during the period 1 September, 1956 to 30 June, 1958

Category	Total Number X-rayed	Total Number Confirmed Tuberculosis	Incidence of of Tuberculosis per 1,000 X-rayed
Gurkha troops	19,745	80	4.05
Other Commonwealth Forces	20,072	24	1.2
Gurkha Families	6,874	6	0.87
Other Military Families	1,838	1	0.5
Civilians (locally employed)	3,344	33	9.8

The above table clearly confirms the comparatively high incidence of pulmonary tuberculosis among Gurkha soldiers, and also indicates the high incidence among a selection of the civil population working within military units. The latter undoubtedly provide a likely source of infection for the susceptible.

It is of interest to note that during the above period sixty per cent of the total admissions of cases of pulmonary tuberculosis to military hospitals in the theatre were detected by mass miniature radiography. This emphasises its value as a diagnostic weapon and aid to early treatment, leading to a good chance of recovery from the disease.

Tour programmes, however, are constantly hampered by breakdowns of various kinds. The apparatus is extremely delicate and subject to numerous minor disorders, while the vehicle and generator also suffer as a result of excessive wear and tear. The first year of service of the new vehicle, during which 18,000 miles were covered, included one major refitting of brakes lasting six weeks, six minor breakdowns of the prime mover involving a loss of eight days, two minor breakdowns of the generator truck involving a loss of thirteen days, one breakdown of the generator involving the loss of one day, and nine breakdowns of the X-ray equipment itself involving a loss of twenty-three days. Thus, during the first year alone, eighty-seven days were lost. Following the first year's work a further two months were lost while the X-ray apparatus underwent extensive repair, and subsequent tours have frequently been marred by breakdowns of various sorts. Unfortunately the delicacy of the apparatus is not always appreciated by the "laity," and its unreliability has on occasions given rise to complaint. In time to come no doubt its weaknesses will be foreseen and a sufficiently sturdy piece of equipment produced which will withstand the rigours of Malayan roads.

Notification of cases

In order to minimise delay between discovery of a case of active tuberculosis and the necessary action required to check all possible contacts instructions have been issued to all hospitals to notify known or possible cases as soon as possible. The following procedure is used. Provisional notification is made in all cases with suspicious clinical or radiological findings, but not necessarily confirmed bacteriologically. The notification form (F. Med. 85) is sent to the medical officer in charge of the unit, the senior medical administrative officer (Deputy Director of Medical Services) and for information to the headquarters of the Brigade of Gurkhas. In addition to the dispatch of the notification form, which should be done within twenty-four hours of the patient's admission, the unit to which the case belongs is notified by signal, indicating if possible the period over which contacts should be traced prior to the date of admission of the case, based on length of history and severity.

Provisional notifications are subsequently confirmed or cancelled, depending on bacteriological and other findings. The following are the criteria for notification:—

- (a) Cases in which Mycobacterium tuberculosis has been demonstrated.
- (b) Cases with other significant evidence of pulmonary tuberculosis, without bacteriological proof, such as characteristic X-ray shadows indicating soft infiltration and cavitation, unexplained pleurisy with effusion, or a positive tuberculin skin test in children three years of age or under.
- (c) Active primary pulmonary tuberculosis.

Cases showing pulmonary calcification including healed primary tuberculosis, or limited cases of fibrosis without history or symptoms are not notified.

In order to assist epidemiological study, the following details are included on the notification form:—

- (a) Method of presentation—whether with clinical signs, as a contact, or as a result of routine examination such as M.M.R.
- (b) Suspected source of infection—brief details of any possible contact. If there had been no known contact this should be stated.
- (c) Immunological information—date and result of any tuberculin tests. Date of B.C.G. vaccination if given.
- (d) Date and result of last chest X-ray prior to present illness.
- (e) Date of return from last leave in Nepal, and location in Nepal whilst on leave.

In addition, the following information is given to aid the surveillance of close family contacts.

- (f) Whether the patient is married.
- (g) If he or she has children.
- (h) Whether accompanied by his family.
- (j) The exact location of the family.

Contact tracing and follow-up

Contact tracing is initiated in the unit as soon as the signal or notification is received. Contacts are regarded as persons living, working or otherwise associated intimately with a person who has notifiable tuberculosis. A list is prepared of everyone in the same household, barrack room, office, regimental band, or eating at the same table, and all are examined to discover the possible source of infection. This procedure for contact examination is as follows:—

- (a) A tuberculin skin test, irrespective of age, is performed on all persons for whom there is no record of either a previous positive result without B.C.G. vaccination, or a positive test within the past year, subsequent to B.C.G. vaccination.
- (b) A chest X-ray is taken by quickest means. This can be done by M.M.R. if convenient, otherwise a full plate must be taken at the nearest hospital.
- (c) Negative tuberculin reactors with a clear chest X-ray are given B.C.G. vaccination and followed up as previously described.

Further surveillance for contacts under thirty years of age continues in the form of a chest X-ray and clinical examination every three months for a period

of two years after contact. Re-examination of contacts over thirty years of age is not considered essential. Mass miniature radiography except for children under the age of five, is used for review of contacts whenever practicable. In order to ensure continuity of follow-up, a central register of contacts is maintained in the office of the D.D.M.S. in which records of all X-rays and relevant tuberculin tests are maintained. Dates of future attendance, for information of medical officers concerned, are also maintained. Medical officers also maintain contact registers within units, and the medical envelope (F. Med. 4) of each contact is marked with a red label, giving duration of surveillance. Thus, when a contact is posted from one unit to another, he is readily identified from his medical documents.

Contact tracing during the period 1 July, 1956 to 31 December, 1957 resulted in six admissions to hospital out of approximately 700 contacts under surveillance at the time. This represented four per cent of the total admissions for tuberculosis during the period. In spite of this small return, however, contact tracing must be regarded as an essential feature of any control scheme, and must be maintained.

Isolation and treatment of cases

A sanatorium of approximately 160 beds exists in the British Military Hospital, Kinrara, near Kuala Lumpur, to which all cases of pulmonary tuberculosis among Gurkhas and their families serving in Far East Land Forces are admitted. Here they undergo a period of treatment and rehabilitation lasting two years, under the supervision of a specialist in medicine. During this period the Gurkha soldiers remain on full pay and allowances, which obviates financial hardship and encourages the patient to complete his treatment. In certain cases this period can be extended. In the majority of cases chemotherapy is given initially and chest surgery considered at a later stage. As this paper deals mainly with the preventive aspects of the problem, treatment will be dealt with only in brief. The combination of drugs considered most suitable during the period under review is that of streptomycin and isonicotinic acid hydrazide (INAH) administered in the following way. One gramme of streptomycin intramuscularly and 200 milligrammes of INAH orally are given daily for the first thirty to ninety days, depending on the severity of the case (Mackay-Dick and Slattery, 1958, and Eade et al., 1959). After this, the two drugs are given in the same dosage on alternate days to complete two years. Para-aminosalicylic acid (PAS) is only given when the patient cannot tolerate streptomycin.

Cases considered suitable for surgery are transferred, when due for operation, to the Army Chest Centre, Hindhead, in England. Case notes and X-rays are initially sent to the Army Chest Centre for the assessment of suitability of the case, and the patients transferred after approximately six months chemotherapy. During the years 1956, 1957 and 1958, out of 120 cases reviewed, 103 were considered suitable for lung resection, and by August, 1958, ninety-eight had been sent to Hindhead, of whom fifty-one had already returned. All these cases are to complete their two years' treatment, or if necessary extend the period

to give a clear six months following their operation. During this time they will undergo rehabilitation and military training with a view to their return to army life.

Follow-up of former hospital cases

It is considered that all cases discharged from the sanatorium and found fit to remain in the Army should be followed up for a period of five years. During the first year, the soldier remains in a low medical category (P7) and is employed in a restricted capacity on sedentary duties, preferably in the headquarters of his unit, where medical supervision can be easily maintained.

For the first year he is reviewed every three months, by means of chest X-ray, sputum test or laryngeal swab, erythrocyte sedimentation rate, and record of weight. Should there be any doubt about the X-ray appearance, tomography is carried out.

During the second and third year his category is raised (P3), and he is given more active employment, surveillance being continued on the same lines as before. During the fourth and fifth years he remains in the same category, the period between reviews being extended to six months. At the end of this period, provided all is well, he should be fit for upgrading to a higher category (P2) with unrestricted employment. A similar programme of review is also planned for former patients among the families as far as is practicable.

Summary

A scheme has been in existence since 1952 to co-ordinate the detection, control, and treatment of pulmonary tuberculosis among the personnel of the Brigade of Gurkhas. The epidemiology of the disease remains unsolved, but several possible contributory factors to account for the comparatively high incidence of the disease among Gurkha troops are discussed. The control scheme depends on early protection of susceptibles by B.C.G. vaccination, early detection of cases by the use of M.M.R., a system of contact surveillance, an adequate period of isolation and treatment of cases including chest surgery, and follow-up of all cases with the object of restoring as many as possible to normal life.

Gratitude is expressed to the commanding officer and staff of the British Military Hospital, Kinrara, Malaya, officers of the Headquarters of the Brigade of Gurkhas, the officer in charge Gurkha Records and the regimental medical officers of the Gurkha units serving in Malaya for their help and co-operation, without which this paper could not have been written.

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THE SURGERY OF TRANSPORTATION*

BY

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WHEN I was asked to speak on the "Surgery of Transportation," the subject left me puzzled. Did the title mean the surgery of casualties on the line of evacuation or was it the means by which these surgical casualties were to be evacuated? I pondered on what transatlantic influence had affected our military terminology, and ultimately interpreted the title as meaning the way in which the methods of evacuation and care of the casualty en route have changed in recent years. These changes have produced new problems in themselves and in addition they have to be visualised in the light of a possible mass casualty situation. The latter problem varies from a small atomic shell to the larger thermonuclear H-bomb, but in these large explosions it will not be so much a problem of evacuation as one of collection of casualties. If an H-bomb were to drop on a big city in the United Kingdom the necessary surgery will almost certainly be brought to the incident, not the casualties evacuated to the site of surgery. However, an atomic bomb dropped on our own troops in the field is bound to be small, otherwise it would cause almost as much embarrassment to the sender as to the recipient. If our troops are advancing and casualties are heavy, there is no reason for evacuation, and our medical services can be brought up to the nearest point behind the incident where they can then open up and hold casualties. We also, however, have to face the large numbers of casualties which may occur when the forward units are in retreat or regrouping, a tactical manœuvre which will probably be necessary when their numbers have been depleted. We therefore have to consider evacuation firstly in conventional warfare and secondly when a small atomic incident occurs.

I intend to deal with the casualties right from the front line, back to the base hospital, with a few observations at each area as seen through the eyes of a surgeon. We must consider the place of forward surgery in the line of evacuation and the transport of the bulky equipment necessary for that surgery, including a few words on the reduction of these loads. Some of the modern methods of evacuating casualties will be described and I shall try to cover briefly the modern views on first aid and forward treatment of shock and burns.

Starting in the battalion area, I recall with some amusement, the trends in shock therapy about the middle of the Second World War. I was taking over a regimental aid post from a battalion medical officer, when a major injury was

Lecture given to medical officers of 43rd Wessex Infantry Division and visitors from the Army Medical Directorate and Southern Command.

brought in following the burst of an anti-personnel mine. Clearly this injury was sufficient to produce a state of shock within the next few hours. Intravenous fluid had recently been issued even as far forward as the regimental aid post and between us we set up a transfusion. The patient on his stretcher, was then loaded on to a mule with a sitting casualty on the other side of the animal as a counterbalance. The drip bottle was hung on a broomstick fixed vertically to the middle of the pack saddles. The other R.M.O. and I watched with great satisfaction as this quaint procession disappeared over the mountain passes. Nowadays we hope that the patient will always reach the forward surgical unit in good time and well before shock has set in, and that intravenous fluid will not be needed so far forward.

Another occasion I remember as an R.M.O.; I had evacuated a casualty with an abdominal wound and a fractured femur. This was always one of the worst combination of injuries, but the R.A.M.C. orderlies at the regimental aid post were justly pleased with their efforts because the patient had been brought in from a forward position in the dark, trussed up in a Thomas splint and despatched by jeep all within half an hour. It was only a short run to the A.D.S. and not more than another half an hour back to the C.C.S. where two surgical teams were also attached. I had inspected the Thomas splint by torchlight before sending the patient on and was impressed by the excellent immobilisation my R.A.P. corporal had achieved in the dark. Furthermore, the patient's condition was quite satisfactory considering the severity of the injury. Some three hours later, when things were quiet at the R.A.P., I slipped back to the A.D.S. for a chat with my colleagues, only to find my patient still lying there, but by this time he was in a profound state of shock. They were attending to his Thomas splint, "fiddling with it" would be a more appropriate description, because the dressing was heavily blood-stained, which was not surprising and they thought they could do something to improve it. Fortunately they had blood available at the A.D.S. and this was put up, but the patient was quite unfit to move even the short half-hour run on to the C.C.S. In all it was eight hours before the patient finally reached the C.C.S., whereas he could have been back within an hour and a half at the most.

Needless to say, my wrath was unquenchable until the second-in-command of the field ambulance, who was a man of great tact, gave me a stiff whisky, and sent me back to the R.A.P. to cool off.

I quote this case with no reflection on my colleagues as it happened many times on lines of evacuation of casualties, until those responsible for the various staging posts realised the intense value of time. So often they would complain that once the patient reaches the C.C.S. there may be considerable further delay. But that is not the point. Once shock sets in, the patient becomes a bad transport risk, and the object should be to move a seriously wounded patient back as quickly as possible, so that he reaches the forward surgical unit in time to forestall any shock by appropriate intravenous therapy under better conditions than a regimental aid post or advanced dressing station can offer.

There is nothing new in this plea to economise in time. The rapid and smooth

evacuation of the wounded soldier has long been the ideal sought by military surgeons. We all know the value of every minute saved between the time of injury and the time when initial transport has been completed. Our attention has therefore been focused in recent years on attempting to reduce the number of staging posts and secondly on more speedy means of transport. In the Second World War the field surgical team first made its appearance. This consisted of a surgeon, an anæsthetist and half a dozen men who could be attached either to a field dressing station or to a casualty clearing station. They rarely came farther forward in the line of evacuation than either of these holding units, except in the case of airborne field ambulances who had two field surgical teams attached to each field ambulance. It was decided in those days, quite rightly, that surgery could not be brought any farther forward than adequate nursing could be maintained. At that time we were totally dependent on our nursing officers, but gallant as these ladies are, it is impossible to arrange the necessary accommodation and attention in areas farther forward than the field dressing station. I trust that our Q.A.R.A.N.C. officers will not take these words as a slight on their courage, because nothing could be farther from my mind. But thinking on this matter, I asked a Royal Air Force officer in transport command, who was responsible for evacuation of casualties, what arrangements were made for some degree of privacy for the female casualty. His reply was simple. He said that he only catered for wounded soldiers in the forward area. This is only one of many difficulties that arise when we have ladies in the forward areas. The same question was considered in great detail when it was first suggested that Q.A.R.A.N.C. officers, or as they were in those days Q.A.I.M.N.S., were to drop with the parachute field ambulances. Even though there were numerous volunteers, it would have been impossible to make the necessary provision for ladies. Finally we must not forget the danger to the fair sex of leaving them unchaperoned amongst hordes of uninhibited soldiery, who have been leading a violent but otherwise monastic existence.

In the airborne field ambulances there were many other ranks of sufficiently high intelligence to be instructed up to a high standard of nursing. This process of training them came, however, as a rude shock to the surgeon and other medical officers who realised for the first time how little they themselves knew of the first principles of nursing, in fact, the most elementary principles of how to deal with the daily physiological functions. Now the Army is making a great effort to train a large number of male nurses up to the standard of state registered nurse and I believe we have our present Director-General to thank for this laudable plan in the training of the R.A.M.C. other rank. With the help of these men we may yet be able to take surgery still farther forward in the line of evacuation; in fact, I hope that it will be possible in the future to transport our casualties to the surgeon in one or at the most two hops from the regimental aid post.

Two years ago we heard about units called medical collecting units, medical staging units and evacuation hospitals. Nothing has been heard of these units however, since that time, and I have reason to believe that we are back at square

one, in other words we are back with the old field ambulance, though its role and its training will be different. My own belief is that the light field ambulance, modified on the airborne lines, will fit the requirements of modern warfare in every respect. You will recall that I mentioned this at our exercise here in Taunton in 1956, and it was with great satisfaction that I witnessed at the Director-General's exercise last year the field demonstration enacted exactly on these lines using an airborne field ambulance complete with field surgical teams.

The field ambulance of the future must be capable of collecting, treating and holding casualties for anything up to eight or even ten days. The casualties will then be evacuated by a motor ambulance convoy or aircraft in regular, orderly lifts to the base hospital, after the heat of battle or the immediate chaos of an atomic explosion has passed. This is not a new problem in war and was first experienced in the airborne units when these were expanded up to divisional strength. The situation in this case was anticipated to produce a vast number of casualties, up to fifty per cent of the division, in a limited area and in a very short space of time. All the casualties from one division were to be collected, treated and held by the medical units. With this task in view, considerable modification of the divisional medical services was necessary. Much thought, labour and, above all, experience went into the planning of the airborne medical services and the ultimate conclusion was to equip each field ambulance with two surgical teams and each fighting battalion with more medical personnel who were equally distributed between the companies and the regimental aid posts. As you know, these units coped with vast numbers of casualties occurring in airborne operations. They worked as a team, each one being a cohesive unit, self-contained and self-supporting. The officers and men, including the surgical teams, had trained and worked together and that as we all know is the fundamental basis of an efficient army unit.

The new arrangement of our combatant forces into independent brigade groups suggests a further reason for making the field ambulance even more an integral part of the brigade than it has been in the past. The brigade group must be self-supporting in every respect, even to the treatment, sheltering and feeding of its own sick and wounded. You may suggest that this would be extravagant in personnel, but I would remind you that in the British Army, only 4.9 per cent of military personnel are concerned with medical services as against 9 per cent in the Russian army although their training probably does not reach our standards.

We must now consider what surgery is to be given at this forward point in the line of evacuation. You will recall that three years ago I spoke here on the possibilities of bringing young surgeons forward. I felt that young men were quite capable of doing useful work in the forward area. Since then, however, I appear to have been slightly misquoted. It was not intended to convey the impression that these were inexperienced young doctors with little surgical training, nor was it intended that they should be sent forward without any supervision. These young men, if they are going to be used in the forward areas, require a reasonable training in traumatic units in this country and also

in other specialist units. When they are ultimately sent forward with the field surgical team as graded surgeons—or in modern terminology, junior specialists—they are then still under the supervision of a more senior surgeon, presumably in charge of the other field surgical team. The senior surgeon is there to give guidance and also to treat the more difficult cases. On the other hand I feel that the skill of the more senior man is wasted on treating many of the smaller, peppering wounds which often take up so much of his time. This is going to be even more important in the future when many of the casualties will be burns, the majority of which could easily be treated by a junior surgeon. The training of surgeons who are going to function in these forward areas requires further thought.

The training of surgeons is not only a problem affecting the junior and relatively inexperienced man, but nowadays affects many of the more senior surgeons as well. Most of those who claim to be general surgeons, and this includes even our professors, are in fact, no longer general surgeons. Many of us who are in even more clear-cut specialties will be expected in the event of war to cope with general traumatic surgery, but few of us these days can claim to see many injuries with the exception of the occasional road accident and then only when our own specialised portion of the anatomy is involved. Our plastic surgeons, orthopædic surgeons and neurosurgeons have taken most of the traumatic surgery out of the hands of the general surgeon. I would therefore suggest in all deference to my general surgical colleagues that most of us would, in the event of war, require some initial training in traumatic surgery as a refresher course. It would not be out of place if part of the territorial training of all T.A. medical officers and especially surgeons, was devoted to attending burns and traumatic centres. T.A. general hospitals nearly always have an excess of officers at camp and most C.Os. will, I am sure, agree with me, that it is often difficult to keep them all occupied and entertained, and a visit such as this would be profitable, not only for the individual officer, but for the Army Medical Services as a whole.

One additional factor to consider in forward surgery, is the weight of the equipment. Our logisticians are hammering louder and louder in their efforts to reduce the bulk of equipment that has to be carried by an army. We are rapidly reaching the stage where our forward troops are anchored down by the weight of second echelon. The medical corps must accept part of the blame for this and as a surgeon, I readily admit that we are probably the worst culprits of all. It is therefore very important that we should reduce our requirements to a minimum, both in weight and in bulk. Once again we have much to learn from the airborne field surgical teams. One airborne jeep and trailer can carry sufficient equipment and sterile dressings for two surgical teams to function for 36 hours (Golighter & Wells, 1945). The load included eight folding camp beds, a 4-kilowatt light generator and an operating table. In addition, each member of the team carried a 60 lb. load in a rucksack. To illustrate a few recent developments aimed at this weight reduction, I quote the following examples:—

(a) New burn dressings, of which 100 correspond in bulk and weight to

twelve of the old types and these have the additional advantage of being non-adherent, fully absorbent and painless to change as they do not damage new granulation tissues when they are removed.

- (b) Intravenous drip bottles and tubing, made entirely from plastic which can be packed into a very small space.
- (c) A light folding bed designed by R.A.O.C., with a total weight of 23\frac{3}{2} lb.
- (d) A light field model autoclave of only 21 cwt.
- (e) A light 1 ton shelter measuring 54×20 ft., including petrol-driven heater.
- (f) Thackeray's compressed plastic gauze which can be re-sterilised several times.

So far we have tried to shorten the time between the patient's injury and the time at which he reached the field surgical team by bringing the surgery farther forward. We must now cast our thoughts on the more modern methods of transporting the casualty. Baron Larrey, Surgeon-in-Chief to Napoleon's grand army, recognised the importance of speedy evacuation and ordered the first horse-drawn ambulance. This was so much faster than any other means at that time that it was known as the "flying ambulance." Some years later in 1870, during the siege of Paris, sick were transported by aerial means for the first time. An observation balloon was used and this lifted 160 patients from the city (Pillsbury, Macmillan & Artz, 1957). The first time a force was largely dependent on air evacuation for its sick and wounded was in Burma in 1943. When faced with an enemy such as the Japanese, there was an overwhelming need for evacuating all casualties as quickly as possible. Having to abandon casualties under such circumstances would have been a great strain on the morale of the men and their commanders. The lessons learnt in Burma were surveyed in considerable detail by Wigglesworth (1948). He described the various methods used and the tremendous advantages of air evacuation over the long and slow land routes which were sometimes impassable; how during the siege of Imphal, casualties were evacuated at an average of over a thousand per week and how aircraft, used for taking stores forwards, were then adapted to bring casualties back. Where small aircraft could not be landed on airstrips, then other methods were used such as Sunderland flying boats landing on inland lakes or rivers when, for example, the Chindits were surrounded, or on the second Wingate expedition when gliders were used and "snatched up" by low-flying Dakotas. A Wayco glider could be made to hold as many as fifteen sitting casualties or four stretcher cases. He also stated that towards the end of the campaign, aircraft were frequently required at short notice and a small proportion were allotted for the role of casualty evacuation only.

The Americans have their military air transport service and several Convairs are constructed especially for air evacuation of casualties only. This would, however, appear to be wasteful as the normal transport plane should be readily convertible at short notice, by the simple addition of stretcher fittings. In Korea the helicopter was used for the first time to evacuate casualties from forward

areas, and it was an astonishing revelation to see at that time, how safe this form of transport came to be. One would imagine from the appearance and lumbering gait of this aircraft that it would be highly vulnerable in the air, but it was readily manœuvrable and suffered little from attacks by fast-flying jet aircraft. I understand from our R.A.F. colleagues that a helicopter is an extremely difficult target to hit from a jet powered plane. The helicopter really came into its own in the Suez campaign, where they were flown back and forth from an aircraft carrier and casualties were receiving surgical treatment within half an hour of injury. In Korea we were told that the helicopter was hard to obtain and often the delay was long, but I understand that at Suez our medical services received no such complaint.

Air evacuation resolves itself into two distinct types. The short forward evacuation from casualty collecting posts or regimental aid post back to the field surgical unit—in other words, pre-surgery. This evacuation is usually carried out by small low-flying aircraft such as Austers or helicopters. The second type of air evacuation is the longer lift required from the forward surgical area back to the base hospital or from the base hospital back to the U.K. For the short forward evacuation, the Auster is probably the ideal aircraft as this can fly for eight hours and at the end of that time requires only one hour's servicing. The helicopter, however, is just about the reverse of that economy. I am told that after one hour's flying, it requires about eight man-hours to service it. Nevertheless, the helicopter can be flown into places where not even an Auster can land, and the larger helicopter, such as the Whirlwind, can do a round trip as far as 300 miles with six stretcher casualties and an orderly on board. Other smaller helicopters, such as the Widgeon, have a range of 150 miles with two casualties and an orderly on board. Small aircraft such as this are particularly useful for evacuation of head injuries and it was in Korea that they were first used for evacuating casualties back to the neurosurgeons. The head injury requires separation from other casualties, not only because of speedy evacuation, but also because such a casualty amongst a number of limb injuries will take away the necessary medical attention from all the other casualties in the aircraft. Korea special helicopters were attached to the neurosurgical team and the pilots of these aircraft lived with the members of the surgical team. Living with the unit in this way, the pilot soon learnt to be a very useful first aid assistant for the head injury.

The Americans now have helicopter ambulance companies on their army establishment, and they have put forward a good case for training medical officers as helicopter pilots—a scheme for which, I am sure, there would be numerous volunteers, though personally I doubt the value of training a doctor to be an ambulance driver. Neel (1955), describing the use of helicopters in Korea, states that ground to air recognition caused some difficulty. Radio communication with the pilot of the aircraft was much less effective than the use of smoke or visual panels, which were ultimately adopted in all cases.

We now come to the aircraft used for the longer flights. The aircraft still in use in transport command for casualty evacuation is the Handley Page

Hastings. This aircraft will take 32 stretcher and 26 sitting casualties. The stretchers are arranged on either side of central pillars and strapped to these pillars. At present this is the only aircraft which can take any large number of casualties and at the same time is fully equipped to cope with the emergencies which may arise amongst those casualties. The Beverley aircraft, which is probably the ugliest machine that ever took to the air, has also been demonstrated as a suitable aircraft for casualty evacuation, though in practice this has not been used yet to any great extent and it has certain disadvantages which cannot be overcome.

Let us now consider the requirements of an air ambulance. First of all it must have a good wide door for easy entrance for man-handling stretchers into the aircraft. Secondly, it must be adaptable for fixing these stretchers securely. Finally, it must have a comfortable flight and an adequate ceiling to avoid the weather. As regards its internal fittings, it should have a good water supply which is gauged at approximately half a gallon per patient for long hauls. There should be oxygen available which preferably could be tapped at any part of the aircraft near to the patient. There should be good toilet facilities and lighting all down the inside of the aircraft. In addition to these requirements there must be sufficient room for convenient nursing of the patient and a distance between each stretcher above and below to allow for administering bed pans and for the patients to turn for feeding or possibly to vomit. Finally the aircraft should have a small galley for preparation and storage of food.

The Hastings has the disadvantage of lack of pressurisation, which means that it cannot climb above the weather. The Beverley is ill-equipped for casualties as most of the essentials are lacking and its flight is too rough due to the tail whipping back and forth like the boom on a yacht when it is tacking.

Of the pressurised aircraft the only one used so far as an air ambulance is the Comet. This has a narrow entrance and an even narrower door in the bulkhead just behind the entrance, with the result that it can carry only three stretcher cases though the sitting casualties can be numerous. The Bristol Britannia will have all the essentials of a good air ambulance and is being adapted to carry fifty-four stretcher cases in nine groups of six.

The despatch and arrival of patients can be simplified by bringing the hospitals near to the airfields. The Royal Air Force have already planned the despatching end by the establishment of an evacuation unit called the Casualty Aero-evacuation Flight or C.A.E. This consists of three sections, the reception, the holding ward, and the despatching ward where the patients for the next flight are collected and prepared for their journey. On arrival at the other end the reception of the casualties will be speeded up by siting the base general hospital near or on the airfield, so that planes can taxi round the perimeter track to disposal bays near the main surgical wards.

It is impossible in one short lecture to discuss the surgical treatment of all casualties, but there are one or two subjects which have been discussed recently in the medical press and are worth repeating or amplifying here.

The Thomas splint having served us well for many years, has now com

under fire of criticism. It has been described as outmoded by the new American version with an anterior strap and only a half ring. Let me assure anyone who may be in doubt that the full ring of the Thomas splint is still the most effective method of immobilising a limb. The half ring and strap does not fit so firmly on to the ischial tuberosity and the whole splint tends to rotate. Some of the civilian accident units have suggested that the Thomas splint is unnecessary as the damaged limb can be tied to the good limb and the patient moved straight to hospital. These critics do not allow for a long bumpy journey in an army ambulance over somewhat indifferent road surfaces.

The use of morphia in trauma is probably overdone. The severely injured patient does not always complain of pain, in fact that is usually one of his least worries. He may be restless, and morphia is then required to settle him, but when given the morphia should be injected intravenously where possible. So often we have seen the shocked patient given a subcutaneous or possibly an intramuscular injection of a morphine derivative when their peripheral circulation is poor and the drug merely pools beneath the skin. As soon as the shock is relieved, the circulation improves and the drug is absorbed with consequent depression of respiration just at the time when the anæsthetist is about to perform. I would here condemn the "tubonic." This toothpaste tube of morphia has a short needle, which can scarcely reach beyond the subcutaneous tissues. The amount squeezed out is very variable in quantity and it is impossible to give it intravenously. The new cartridge type of syringe to be issued to all regimental medical officers appears to be the safest and most effective means of giving morphia.

New emergency dressings are frequently produced. I have already mentioned the new burns dressing and compared it with the old type. Various ideas were suggested for replacing the old shell dressing, but the quantities stored are more than enough for another war, so I doubt whether anything will supersede them.

Now for a word on the treatment of shock and of burns. Most of you will have read the excellent article by the late Ruscoe Clarke (1957) from the Birmingham Accident Hospital. This summarises the views that most surgeons and anæsthetists have been tending towards in the past few years. It has been well known that when severe collapse followed a major injury, there was an associated fall in blood volume. The amount of hæmorrhage visible was not enough to account for the fall in blood volume, and therefore it was assumed that the missing blood must still be in the circulation. But where in the circulation could it have disappeared? We were left with the assumption that the blood must be pooled in the capillaries.

Unfortunately this theory fell down on the failure of this hidden blood to appear, and secondly one had to postulate that only the hidden capillaries dilated, because the surface capillaries went into spasm and emptied themselves of blood as was obvious to anyone who looked at the patient.

The answer appears to be much simpler—the blood volume has disappeared into the tissues around the site of the injury and not into the hidden capillaries. In fact it has not really disappeared into the damaged tissue because, as Ruscoe

Clarke showed, the swelling of the injured tissues is equal in most cases to the actual loss in blood volume.

In this brief lecture I have tried to cover various aspects of forward surgery and the evacuation of surgical casualties. I have purposely omitted discussing the well-tried and proven facts of casualty evacuation and treatment as I am sure most of you here are well acquainted with these facts. I have confined myself to the controversial features about which there is still some doubt.

One last word I would like to add is a suggestion for the training of Territorial medical officers in the near future. I feel we must all concentrate, whether our unit is a general hospital or a field ambulance, on preparing ourselves for the double role, firstly the highly mobile small holding unit and secondly the normal functions for which our unit was originally designed for conventional warfare. Our Director-General has conceived the idea of the field medical company, which in principle is excellent; however, it still is in embryo and has many shortcomings. Our efforts as Territorials should be, not only that of training our units, but of contributing ideas and constructive criticism which can help in overcoming the formidable casualty problems of the future. I therefore suggest that our young medical officers should have discussion groups on this subject, followed by practical layouts and as I mentioned earlier in my lecture, some traumatic surgical training should be arranged for all.

Finally may I take the liberty of saying to our visitors from Whitehall—we have the enthusiasm, will you please let us have the equipment that is not already obsolete, even if it is only on very temporary loan, so that we do not have to plan and instruct in the land of "make-believe."

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Matters of Interest

BERTRAND STEWART PRIZE ESSAY COMPETITION, 1960

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Subject: Cold War operations carried out in recent years in the differing conditions of Malaya, Kenya, Cyprus, and the Persian Gulf have proved the worth of tactics and training based on "unconventional" methods. At the same time "conventional" military operations against terrorists have had little success.

Discuss the extent to which training for all arms should be based on this type of operation and the degree to which it is applicable to limited or global war.

Discuss these problems from the Regimental officer's point of view and give your views as to how they can best be met.

General conditions for this essay competition are contained in A.C.I. 410/1959.

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Give your views on how the system has worked since 1945—from the standpoints of the Fighting Services, the country as a whole and the individual National Service man.

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Prize: Thirty guineas and Gold Medal. Closing date: 16th November, 1960.

Subject: 1. Discuss the importance of Africa on world strategy

OR

2. The thermo-nuclear stalemate makes a major war out of the question. The Suez operation showed that a limited war, even if successful, is bound to be a political catastrophe. The internal security of our colonies and dependencies does not call for Forces of the size and complexity, particularly the complexity, that we now have. What, then, are the Services for? Discuss this with proposals on how the Services should be reshaped.

General conditions for this essay competition will be the same as for the 1959 competition and can be found in A.C.I. 82 of 1959.

Correspondence

From Lieut.-Colonel J. Mackay-Dick, O.B.E., F.R.C.P.(E)., Royal Army Medical Corps DRUGS IN THE TREATMENT OF PULMONARY TUBERCULOSIS SIR,

In an appreciable number of fresh cases of pulmonary tuberculosis, estimated at 5 per cent in the United Kingdom, *Mycobacterium tuberculosis* is resistant initially to one or more of the three standard drugs, namely streptomycin (SM), para-amino-salicylic acid (PAS) and isoniazid (INAH). We are advised therefore to give these three drugs together daily in recognised doses (SM 1g., PAS 15g.-20g. and INAH 200mg.) until the results of sensitivity tests are known. Thereafter two drugs are given together, preferably SM and INAH. That is now the routine treatment at the Army Chest Centre.

The drug régime of choice used at B.M.H. Kinrara from May 1955 to 1958 on which researches carried out by Eade *et al* (1959)* (which are continuing) have shown to warrant the description "good treatment," was selected for the following reasons:

- (a) With the laboratory facilities available at the Army Chest Centre from 1953-1955 it was evident that this drug régime was at least as good as any of the chemotherapeutic régimes favoured by the Medical Research Council.
- (b) In Malaya in 1955 the necessary facilities were not available for thoracic surgery and so our aim was to continue chemotherapy for at least twenty-four months in all cases of pulmonary tuberculosis. In these circumstances it would have been unwise for obvious reasons to give streptomycin daily all the time.
- (c) Gurkhas do not differ from others in their dislike of PAS. Also there was not the necessary supervision available to ensure that they would take PAS as prescribed. On the other hand we could ensure that SM and INAH were given as ordered.

We feel that our régime which has stood up to the rigid test of culture of all resected lung lesions from a significant number of cases so treated (five of whom had bilateral partial lung resection carried out) was a wise selection in the circumstances, particularly as we know that results of recent surveys in the United Kingdom and elsewhere have shown that thirty to fifty per cent of tuberculosis out-patients depart from their treatment schedules. It is now acknowledged that deception even by the most trustworthy people is common when it comes to taking PAS and it is often very difficult to ascertain whether or not out-patients are adhering to their dosage regimens.

After initial daily triple therapy, and once patients have become bacteriologically negative, it may well be accepted in the future that, although long term chemotherapy is necessary, two drugs together in the recognised doses need not necessarily be given every day but every second or even every third day.

I am, etc.,

Connaught Hospital, JOHN MACKAY-DICK.

(Army Chest Centre), Hindhead, Surrey.

Eade, A. W. T., Harrison, G. K., Large, S. E., Mackay-Dick, J., Reid, Lynne, and Riddell, R. W. Thorax (1959), 14, 104.



Book Reviews

BIGGER'S HANDBOOK OF BACTERIOLOGY (7th Edition). F. S. Stewart, M.D.(Dubl.), F.R.C.P.(I). London: Baillière, Tindall & Cox, 1959. Pp. 610+x. Illustrated. 37s. 6d.

It is ten years since the last edition of this book appeared, and it might well have been supposed that it had died with its author. His successor has produced a worthy memorial, and this book must surely become a standard work for students. Its value is equally great for the postgraduate who needs to keep up to date with bacteriology and virology, and it can be recommended for students on the Senior and Junior Officers' Courses.

The new edition has shed the chapters on fungi and protozoa, which the author rightly feels require specialist textbooks. He has also reduced the amount of technical detail, but one wishes he had taken this process farther. Like all textbooks it is larger than its predecessor, so it is disappointing to see unnecessary illustrations such as those of the autoclave and the hot air oven.

It is a well-produced book with a good index and its price is reasonable.

R. J. C. H.

Anatomy of the Human Body. R. D. Lockhart, M.D., Ch.M., F.R.C.S., G. F. Hamilton, B.Sc., M.B., Ch.B. and S. F. W. Fyfe, M.A., M.B., Ch.B. London: Faber & Faber, 1959. Pp. 697+ix. Illustrated. £5 5s.

The aim of the authors of this new textbook of systematic anatomy is to lighten the burden of the student's reading by reducing the number of words. To do this illustrations and diagrams are closely related to the text which is clear, readable and instructive. Functional and clinical applications of anatomy are frequently evoked and arouse and sustain interest. The photographs and radiographs and the many carefully labelled and coloured schematic diagrams all help the reader.

Particularly informative are the introductions to the sections, and there is much wisdom in the few words on how to arrange the study of anatomy and correlate the work in the dissecting room with that in the systematic textbook. Embryology is not dealt with and there is only enough histology to link the naked eye and microscopic appearances.

The vexed problem of nomenclature has been solved, where there might be confusion, by placing familiar names alongside the less well known but agreed terms sponsored by the International Congress of Anatomists, 1955. The needs of students of physical education, physiotherapy and dentistry are covered.

This volume embodies a careful selection and presentation of anatomical knowledge, based on much experience. The illustrations are excellent and the descriptions good. The lay-out and production set a high standard. This new work will be widely acclaimed and one envies the beginners who are fortunate enough to be introduced to it.

J. H.

ATOMIC MEDICINE. Edited by Charles F. Behrens, M.D., with 24 other contributors. (3rd Edition.) London: Baillière, Tindall and Cox Ltd., 1959. Pp. 705+xiv. Illustrated. £6.

This, the third edition of the book to appear in the past ten years, again covers all aspects of medical radiobiology. It also deals with the physical background to radiation medicine, the detection and measurements of radiation, the design of laboratories and many other matters as well, all with an authority and clarity of manner unusual in reference works on radiobiology. The portion of the book on nuclear reactors and bombs is naturally less adequate than the more purely medical chapters, and the description of the administrative arrangements envisaged in the chapter "Survival Methods in Atomic Disaster" make strange reading in a technical medical manual. The book is completely up to date and in line with current thought and can be recommended without hesitation to any medical practitioner whose work takes him into the field of atomic medicine.

J. A. H. B.

MEDICAL HISTORY OF THE SECOND WORLD WAR. F. A. E. Crew, F.R.S. London: H.M.S.O., 1959. Pp. 645+xxxviii. Illustrated. £5.

Volume III of the Medical History of the Second World War, presents the view that the performance of the Army Medical Services, both in Sicily and in Italy, reached a very high standard. As one of many who had the good fortune to follow the fighting troops of the British First (later Eighth) Army from Kilmarnock to Klagenfurt, via French North Africa and Italy, it is true to say that, without a medical service of the highest order, the malaria and dysentery, the typhoid and venereal disease, which were all widespread, might have had a catastrophic effect on the outcome of the Sicilian and Italian Campaigns.

This third volume, written like the other two in the clear and concise style of Professor Crew, deals in six chapters with the medical aspects of the campaign which began with the invasion of Sicily in July 1943 and ended with the termination of the war in Southern Europe in May 1945; a seventh chapter is devoted to the medical history of the Return of Greece in 1944.

645 pages, 136 sketch maps and diagrams, 63 tables and 28 plates are required to tell a story of which Field-Marshal Lord Alexander said that when history came to be written the campaign would be judged as one of the most brilliant and successful fought in the Second World War: a campaign in which for the first time the medical services of a rapidly advancing army not only had to deal with the maintenance of health of the troops and the treatment of battle casualties but also had to safeguard the health of civilians ravaged by disease and often destitute and half-starved through the exactions of the enemy.

Should the opportunity arise to compare and contrast this history with the histories of the medical services of the German and Italian Armies in the Sicilian and Italian Campaigns, it would be of supreme interest; seldom before or since has the successful outcome of a campaign of this magnitude depended on the quality of the Army Medical Services, as the antagonists were, on the whole, very evenly matched and any considerable manpower wastage through uncontrolled disease could have had a decisive effect on the eventual outcome of the campaign.

R. P.

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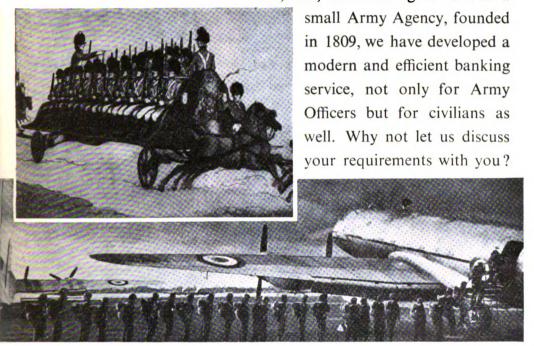
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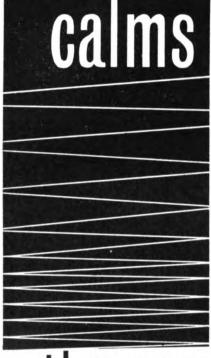
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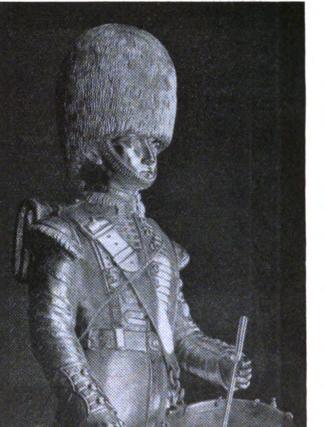


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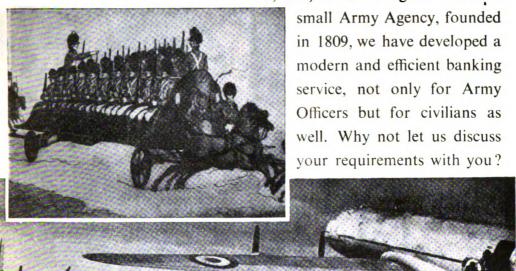
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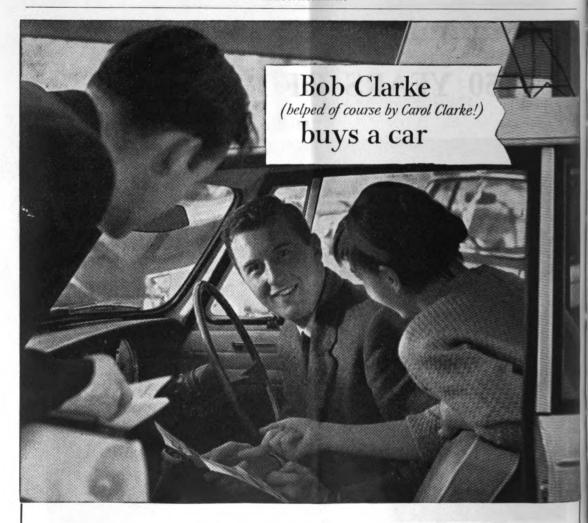
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ANÆSTHESIA AND MODERN WARFARE

BY

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The developments in anæsthetics over the past forty years have been of immense benefit to both patient and surgeon. The patient has been freed from much of the fear and discomfort previously inseparable from a surgical operation. Mortality and post-operative morbidity have been considerably reduced. From the surgeon's point of view operating conditions have been vastly improved and in many spheres surgery has been made possible in cases previously considered quite inoperable. In fact progress in surgery has largely depended upon the advances made in anæsthetic methods and techniques.

All this, however, has been achieved at a price. The simple methods used twenty-five years ago in anæsthesia are inadequate to meet the surgical requirements of today and the practice of anæsthesia has become complex and highly specialised. Furthermore the modern specialist anæsthetist, to get the best results, has armed himself with a mass of complicated and delicate equipment and a multitude of powerful and expensive drugs.

In the Army our peace-time commitments are covered by training anæsthetists in all modern methods of anæsthesia and supplying a full scale of up-to-date equipment for their use. The Army Medical Services, however, have the dual task of operating efficiently in war as well as in peace, and the army anæsthetist must be further trained and equipped to meet the unusual and varied demands of modern warfare.

Disaster and catastrophe, in which large numbers of men are injured, have at all times been accepted as a normal hazard of military service. Today this grave threat assumes a far greater prominence, and our problem is to apply recent developments in anæsthesia to this new military environment.



ANÆSTHESIA IN LIMITED WARFARE

It is incumbent on the Army Medical Services to ensure that the advantages of modern anæsthetics are available to the battle casualty. It must be remembered that with the passage of time the role of the anæsthetist in forward surgery is becoming increasingly important. The surgeon and he are joint principal members of a team. The anæsthetist, however, must be able to provide high quality anæsthesia without entire dependence upon elaborate apparatus, cumbersome medical gas cylinders, etc., the availability of which may be severely limited in the forward defended localities by the vagaries of a supply system in war.

To meet the problems of transport and mobility, field equipment for anæsthesia is being continuously examined and streamlined. The open mask, the simplest of all apparatus, with supplies of ether and chloroform, is retained in all scales of medical mobilization equipment, and the army anæsthetist must be trained and adept in its use. Thiopentone for intravenous anæsthesia and lignocaine for local analgesia require a minimum of apparatus and present no real supply problem. An ether-air inhaler is provided for each surgical team. This simple apparatus is independent of medical gas cylinders and combines portability with the facility for precise and safe administration of ether anæsthesia by face-piece or endotracheal tube.

The more complicated type of apparatus dependent upon the medical gases has been redesigned for the Army in transportable form to provide the anæsthetist in forward localities with the full range of modern anæsthetic techniques.

In the future, it may well be that halothane, the recently introduced inhalational anæsthetic agent, will play an important part in the armamentarium of the army anæsthetist in the field. This drug resembles chloroform in as much as it is a volatile liquid of high anæsthetic potency, the vapour of which is non-irritant and non-inflammable, a distinct and welcome advantage over ether. If, however, dangerous overdosage with this agent is to be avoided, precision apparatus for its control during administration is essential. Light portable equipment for this purpose has already been designed and is notable for its compactness and simplicity. Halothane has a tendency to produce some degree of cardio-vascular depression with an associated fall in blood pressure. significance of this is still obscure, but the over-all safety of this agent for the anæsthesia of casualties suffering from unrelieved oligæmic shock is open to doubt. Research into this aspect of the action of halothane is at the present time being undertaken under the ægis of the Army Medical Directorate Research Committee and the Research Department of Anæsthesia of the Royal College of Surgeons, and it is to be hoped that the suitability of this drug for the anæsthesia of battle casualties will be determined.

ANÆSTHESIA IN NUCLEAR WARFARE

The advent of the latest conventional weapons and nuclear warheads has presented a most difficult problem for the army anæsthetist. There seems

little doubt that forward surgery will be of a more urgent nature, whether it be at field ambulance level in an independent brigade group or at a forward medical aid unit in the civil defence organisation on the periphery of a major disaster.

The problem once again resolves itself into the surgery of life and limb, but in this case the number of casualties is likely to be so large that only the shortest and *essentially* life-saving operations can be undertaken. It has been reliably estimated that under these conditions it may be acceptable to allow only approximately ten minutes to each case, if the maximum number of lives are to be saved.

Consider the implications of this type of situation. Inundation with casualties in war-time is no new experience, but it is not easy to envisage some hundreds of patients in one medical unit, all needing immediate and essential surgery. Improvisations of all sorts, shortage of drugs and equipment, lack of skilled assistants and unrelieved hæmorrhagic shock may all be part of this horrific picture.

Little wonder then that there is likely to be a limit of ten minutes' surgery for each case. In all probability there will not be a specialist surgeon or anæsthetist for each operating team; none may be available even to supervise the work of those with only limited training in these procedures. This will not be the time for a medical, dental or nursing officer to decline to give an anæsthetic because of lack of experience in anæsthesia. The padre, the laboratory technician, the first-aider, the swimming-bath attendant, anyone with an elementary knowledge of respiratory physiology, may be impressed into the work of an "occasional anæsthetist" in these circumstances.

SHORT ANÆSTHESIA FOR MASS CASUALTIES

What method then are we to adopt to provide anæsthesia for ten-minute life-saving operations under these conditions? Let us consider briefly some simple techniques which at first sight may seem suitable, but which in my opinion are not likely to prove effective:

- (1) Local analgesia by local infiltration, field blocks, nerve blocks, etc. This is time-consuming, and requires skill and practice.
- (2) Open ether, while admittedly safe and simple, is far too slow; induction alone may take ten minutes.
- (3) Open chloroform is far too dangerous in unskilled hands.
- (4) Thiopentone. Intravenous anæsthesia requires constant skilled supervision; overdosage is "fatally" easy in the hands of the novice.

It seems that the solution of the problem lies in some form of inhalational anæsthesia which can be safely administered in controlled dosage with the minimum of apparatus and experience, and with which induction and recovery are smooth and rapid.

Bourne (1951, 1952 and 1954) in Great Britain and Hingson (1954 and 1958) in the U.S.A. have for some years advocated the use of cyclopropane for short anæsthesia, pointing out the limitations and potential dangers associated with

the administration of nitrous oxide for this purpose. Both have devised simple apparatus, charged not from ponderous gas cylinders, but from vest pocket size sparklet bulbs. In the use of such a method lies the possible answer to this difficult problem.

Bourne's (1958) apparatus was designed primarily for short anæsthesia in the dental chair. It consists merely of a face-piece, an angle-piece and two-way tap, and a rebreathing bag fitted with a non-return valve at one end, through which the bag can be filled with cyclopropane and oxygen and nitrogen by means of an ingenious pistol-shaped charging device.

One single charge represents some six litres of total gases; general anæsthesia is established after eight to ten breaths from the bag and a subsequent period of one and a half minutes' anæsthesia is provided after removal of the face-piece. Recovery is rapid and complete with a minimum of after-effects, although it must be admitted that nausea is more frequently experienced than after nitrous oxide.

Could this apparatus be modified to produce general anæsthesia for longer operations with the same degree of safety and simplicity? It seemed to the Army Medical Services that this might be so, and Dr. Bourne, to whom the problem was posed, agreed (Bourne, 1959). Hingson (1958) had already reported that the addition of a small carbon dioxide absorber enabled anæsthesia to be prolonged for five to twenty minutes, which was encouraging.

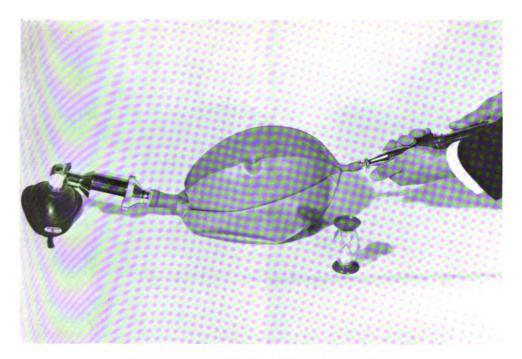
The Army Medical Directorate Research Committee sponsored the development and trial of such apparatus for field equipment, and for the past six months in co-operation with Dr. Bourne and the engineers and scientists of the British Oxygen Company, we have been at some trouble to investigate the full potentialities of this method.

This has led to the production of the "C.O.N. portable anæsthetic apparatus." It bears a close resemblance to Bourne's original equipment, with the addition of a miniature soda-lime canister for carbon dioxide absorption, and a simplified and less expensive charging device.

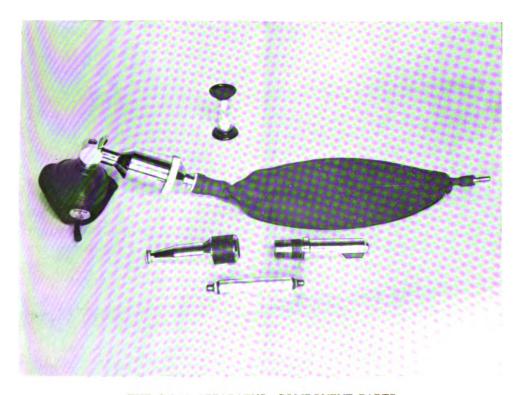
The sparklet bulbs charge the bag with a total gas volume of approximately five and a half litres in the proportion of cyclopropane 40 per cent, nitrogen 30 per cent and oxygen 30 per cent. This constitutes a non-ignitable mixture and so the danger of explosion with cyclopropane under field or improvised conditions has been eliminated.

Our laboratory and clinical studies have shown that inhalation of a single charge of this mixture provides in the adult five minutes' anæsthesia without danger of overdosage, of hypoxia or of build-up of carbon dioxide.

The method of administration is easily mastered. The bag is charged, the face-piece applied, and the tap switched on. The patient now breathes in and out of the bag. Consciousness is lost after three to six breaths, after which there may be a phase of purposeless movements and breath-holding. The anæsthetist ignores these, holds the mask firmly on the patient's face, and maintains a clear airway. Breathing soon recommences and assumes the regular



THE C.O.N. APPARATUS—CHARGING THE BAG



THE C.O.N. APPARATUS—COMPONENT PARTS

Face page 100

rhythm characteristic of surgical anæsthesia. By now about one and a half minutes will have elapsed and the surgery can start. The face-piece is held in position for a further two minutes, making three and a half minutes in all (it is planned to provide a simple timing device as a guide to this period). The face-piece is now removed and the patient allowed to breathe air. Anæsthesia will persist for at least two minutes, during which the surgeon goes on with his operation and the anæsthetist empties and recharges the bag. At the end of this period of air breathing, anæsthesia will have lightened and the patient may begin to move, but is still far from being conscious. The first movement, however slight, is the signal for the anæsthetist to reapply the face-piece and continue as before, and for the same length of time (three and a half minutes). If this rule of allowing an interval for air breathing and waiting for movement before reapplying the facepiece is always followed, there will be no danger of cumulative effects and operations of any length can be catered for. Each application of the face-piece must not exceed three and a half minutes or the concentration of oxygen in the bag may fall below that necessary to insure full oxygenation of the patient. Two consecutive applications give at least ten minutes' operating time. The onset of recovery of consciousness and the return of pharyngeal reflexes normally occur within five minutes of the removal of the face-piece, but may be slightly delayed if the anæsthesia is prolonged beyond ten minutes.

Training of the unskilled assistant in the use of this apparatus under emergency conditions can be reduced to a minimum and need only be directed towards instruction in:

- (a) The basic principles of general anæsthesia.
- (b) The method of charging the bag.
- (c) The proper application of the face-piece.
- (d) The maintenance of the patient's airway.
- (e) The set time period for the application of the face-piece.
- (f) The interval of air breathing between applications.

In brief, then, in the light of our experience so far with this apparatus, it would seem to provide a solution to the problem of short anæsthesia for mass casualties.

Finally, the peace-time application of this method for the short anæsthesia of ambulatory patients in the dental chair, and in civil and military hospital practice, is not without interest. There is a growing weight of opinion that current methods of general anæsthesia with nitrous oxide for dental and other minor operations can no longer be accepted as satisfactory and that they lag far behind the standards of safety and efficiency provided by the anæsthetist today for major surgical procedures.

Cyclopropane anæsthesia with the C.O.N. apparatus offers the advantages of economy, safety, simplicity and efficiency, at the cost only of a slightly increased incidence of post-operative nausea.

SUMMARY

In devising and selecting field equipment for anæsthesia today, the Army Medical Services have to balance the demands of the modern anæsthetist against the practical problems of supply in war.

The mass casualty prospect in modern warfare has presented the army anæsthetist with a new and special task.

The C.O.N. apparatus has been developed by the Army Medical Services to meet the requirements for anæsthesia for short life-saving surgical operations at field ambulance level and it is suggested that this equipment has a wide application in civil and military peace-time practice for the short anæsthesia of ambulatory patients, in preference to the time-honoured use of nitrous oxide for this purpose.

Research, and the development of suitable methods and apparatus, are constantly in hand to find the best solution to these problems. Safety, simplicity and portability are the most important considerations in this work.

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NEW VIEWS ON PROTECTION AGAINST SMALLPOX

BY

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INFECTIOUS diseases have always constituted a particular menace to compact groups of men, such as military formations. Under conditions of active service men live unnaturally close to one another; the atmosphere of action leads to a reduction in personal care and medical officers, at least at battalion level, are likely in periods of preparation, to study the treatment of wounds and injuries rather than epidemic disease.

Fortunately, preventive inoculations are now available against the majority of serious infectious diseases. The Army has a peculiar advantage in this respect as considerable pressure can be put upon individuals to participate in an inoculation plan. Effective antibiotics, insecticides and the improvement in general measures of hygiene have all contributed to reduce the danger of the traditional epidemic hazards.

Smallpox stands almost alone as a disease still retaining the triad of features which make it the most dreaded of the epidemic diseases. Firstly, it is probably the most infectious of all diseases; secondly, it has an extremely high mortality in the unprotected and, thirdly, there is no real evidence that the virus is affected by any known treatment. It has been estimated that over 50,000 people still die annually from this disease in India and Pakistan alone.

The antigenic similarity between the viruses of vaccinia and variola has given us probably the most effective artificial protection that can be elaborated for any known disease. Nevertheless, vaccination has become unpopular among the civil community. In a large city known to the author less than half the new-born are protected, though every artifice of propaganda is used. Epidemiological considerations show that the years are thus approaching when a few badly managed smallpox incidents could easily lead to a widespread epidemic. Though the Army itself is no doubt adequately protected, medical officers cannot dismiss smallpox. The universality of a future war, the inevitable integration of service and civilian medical resources, both require that service doctors should be familiar with the dangers of smallpox and be aware of significant developments in its treatment and control. The aim of this article is to draw attention to two such recent developments which add significantly to our knowledge of the control of smallpox.

Anti-vaccinial gamma-globulin

Vaccination, the protection par excellence against variola major, must precede exposure if protection is to be certain. Thus a person successfully vaccinated less than a year before exposure is completely safe; his immunity, provoked by

vaccinia, has had time to develop and has not had time to become attenuated. Not all the exposed are, however, so fortunate. After the diagnosis of a case of smallpox, vaccination of vulnerable contacts will be undertaken with varying degrees of confidence. It is generally agreed that smallpox takes twelve days to incubate, while vaccinia takes only eight. These four days of grace are unreliable. Ricketts & Byles (1908) stated that successful vaccination within two days of exposure was a certain preventive, and usually protected if performed before the seventh day of the incubation period: performed within the next three days it modified the attack, and performed in the last four days it merely added to the patient's troubles. More recent views, however, suggest that vaccination even within one day of exposure will not prevent smallpox with certainty (Downie, 1959). It is clear that the efficacy of vaccination declines directly with delay.

Clearly it would be of the greatest assistance if the incubation period of vaccinia could be reduced further, so that the mature smallpox virus could still be confronted with antibodies, though vaccination was performed very late—after the eighth day of exposure, for example. The incubation period of vaccinia cannot, of course, be shortened and thus the creation of active immunity remains limited in the assistance it offers. This need not be the case with passive immunity. Could not, so to speak, the prefabricated antibodies be taken from another person so that the act of injection conferred a fully developed defensive front against the smallpox virus, perhaps by then in the last day of its incubation period? A similar technique has been used to modify measles in the debilitated, and, more significantly, to prevent rubella in early pregnancy.

The hyper-immune anti-vaccinial gamma-globulin, used on the occasions now to be mentioned, was prepared from the serum of adults who had been recently and successfully vaccinated. This form of protection was first assessed in India in 1953 (Kempe, Berge & England, 1956). Briefly it was noted that eight of seventy-five close contacts, who had been vaccinated only, developed smallpox. When anti-vaccinial gamma-globulin was used to supplement vaccination, only two of a similarly exposed group of fifty-six developed the disease.

In 1957 there was a limited outbreak of smallpox in Tottenham. None of the exposed contacts who were given gamma-globulin developed the disease (Hogben, McKendrick & Nicol, 1958). In the Bebington outbreak of 1958 two household contacts, greatly at risk, were similarly protected and only a very mild form of the disease developed (Pierce et al., 1958). In 1959, the author assisted in the precautions following a smallpox incident in Liverpool. Here the patient had been ill at home for six days before the diagnosis was made. There were four very close contacts who had been vaccinated forty-five, forty-three, thirty-six and seventeen years previously. All had been exposed to the disease for six days before vaccination was performed. They were accordingly given by deep intramuscular injection 1.5 g. of anti-vaccinial gamma-globulin dissolved in 15 ml. distilled water: none developed smallpox. An inadvertent control was a fifth contact who, owing to recent vaccinations, was not given gamma-globulin

but only re-vaccinated. He developed a prodromal smallpox rash which, however, did not progress further (Semple, Parry & Hobday, 1959).

It appears from the above evidence that protection by anti-vaccinial gammaglobulin should be a standard procedure for exposed contacts of smallpox, whose vaccination is too late to protect. There appears to be no objection to larger doses, and these would be used in a future incident.

It should be remembered, particularly under conditions of military action when civilian medical organisations are likely to be fully occupied, that contacts incompletely protected by vaccination might leave the area and pass from surveillance. Each such person might, if the disease attacks him, start a further epidemic elsewhere. In occupied territory the responsibility for handling this situation, with its impending dangers both to civilians and troops, may fall upon the service medical officer, and any technique which can assist him, such as the administration of gamma-globulin, should be known and used. The Army, in which groups of recruits will be vaccinated regularly, should be in an excellent position to prepare its own inoculum.

Vaccination in the presence of smallpox

Sir William Osler noted, from the examination of many smallpox cases, that the larger the total area of foveation following vaccination, the milder the disease. As vaccination utilises a living virus, however, the soundness of this and similar observations has been doubted; it was considered that if any vaccinia virus at all was successfully introduced into the patient, the virus would propagate to a determined limit and that excess of vaccine or increase in actual area scarified was irrelevant. This appeared to be a rational conclusion and various refined vaccination techniques, such as the single linear insertion, multiple superficial puncture, etc., were advocated and replaced the former cross-hatching technique as a method of primary vaccination. These new methods were commonly used after smallpox incidents when exposed contacts were vaccinated, and it was presumed that the protection against smallpox was unchanged by the alteration of technique, provided always that the vaccination succeeded. It will be remembered that the value of vaccination as an emergency measure to protect contacts depends exclusively upon the probability that vaccinia will "mature" before smallpox. If vaccination is performed in the first three or four days after exposure, this should happen and protection is normally afforded. If the modification of vaccination technique mentioned above delayed the development of vaccinia, the protection would become correspondingly doubtful.

Cross (1959), working with the R.A.F. Institute of Pathology and Tropical Medicine, has shown that, while the development of immunity is ultimately assured after one of the newer techniques, if speedy response in an unvaccinated subject is demanded (which is likely to be the case in the presence of smallpox) then the technique must produce a vesicle at least half an inch in diameter. Past experience shows that the bolder the technique of vaccination, the greater the possibility of encephalitis. This, of course, ceases to be a valid objection to

such a technique when the alternative is a real risk of smallpox. The work of Cross shows that two techniques of vaccination must be considered, and choice made according to circumstances. Firstly, the milder technique produces good immunity in about twenty-one days; this is suitable for use in the absence of smallpox, and reduces the possibility of encephalitis. Secondly, the bolder technique, producing a vesicle of at least half an inch in diameter, is the only safe method of vaccination when the most rapid protection is demanded.

The distinction between "cold" and "hot" primary vaccinations is thus vital, each requiring a different technique for the safest result. Medical officers likely to vaccinate troops or civilians should consider these points carefully.

SUMMARY

The importance of smallpox to army medical officers is stressed and attention is drawn to two important developments in the management of a smallpox incident or epidemic. Firstly, the use of a passive immunising agent, antivaccinial gamma-globulin, to confer protection against incubating smallpox when vaccination is inevitably delayed is discussed. Secondly, the need to relate primary vaccination technique to circumstances is reviewed: mild techniques should be used in the absence of smallpox while a bold technique is demanded in the presence of the disease.

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THE DIAGNOSIS AND MANAGEMENT OF CLOSED INJURIES OF THE EXTRA-HEPATIC BILIARY TRACT

BY

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ONLY a moderate number of cases of closed injury of the bile-ducts has so far been recorded and there are considerable differences of opinion amongst writers as regards management. It is believed that the case described below underlines:

- (a) The difficulty of early diagnosis about which all writers agree.
- (b) The importance of early operation entailing at least the institution of drainage.

CASE RECORD

A National Service man, aged 20, was first seen in a German civilian hospital twelve days after a road accident in which he had been thrown with considerable violence out of a Champ. He had sustained:

- (a) an abdominal injury,
- (b) bilateral fractures of the mandible with minimal displacement, and
- (c) an uncomplicated fracture of the shaft of the right humerus.

He had been shocked on admission but had responded satisfactorily in this respect to intravenous transfusion with a plasma expander. He had developed jaundice on the third day after admission. An exploratory operation had been contemplated on several occasions but had not been carried out because of his poor general condition and because a liver rupture was thought to be the most likely diagnosis.

Examination twelve days after injury revealed an emaciated and jaundiced patient (serum bilirubin 2.8 mg. per cent). There was moderate ascites but no information was available as to how long this had been present. Arrangements were made for his early transfer to B.M.H. Iserlohn.

Peritoneal aspiration through the right inguinal fossa two days later produced 38 ounces of bile-stained fluid. It was then decided to try to establish more direct drainage. Accordingly, a limited laparotomy was done through a four-inchlong right subcostal incision under local anæsthesia. At this operation 7 pints of bile-stained fluid were removed but it was not possible to make out the true state of affairs in the right sub-hepatic region owing to the presence of dense adhesions. A drain was left in the peritoneal cavity beneath the wound but this measure proved to be completely ineffective. Consequently, during the next four weeks several paracenteses were necessary, a total of 18 pints of bile-stained fluid being removed—all of it through the left inguinal fossa. No other area of the abdomen could be induced to yield fluid in any quantity.

About three weeks after the laparotomy the patient's general condition, which had been slowly improving, began to deteriorate and he became pyrexial. Radiography showed that both sides of the diaphragm, particularly the right,

were much raised but it was difficult to be sure about the radiological changes on account of the presence of excess intraperitoneal fluid. A subphrenic abscess was strongly suspected but, since this diagnosis was not certain, a second laparotomy under general anæsthesia was done through a right paramedian incision. A very large right posterior subphrenic abscess was found which extended below as far as the pelvic brim. The abscess was drained both at its lower end and through the bed of the twelfth rib posteriorly. His general condition improved immediately and never again caused anxiety. At first the discharge was heavy but the drainage wounds were soundly healed four weeks after the date of the operation. Management of the tubes was controlled by sinograms. There was no further accumulation of free fluid following the second laparotomy. Supportive measures used during this long illness included several blood transfusions and the administration of various antibiotics. The fractures of the mandible and humerus were treated conservatively and a good result obtained in both.

The patient was evacuated to the United Kingdom three and a half months after his accident. At that time he was well and active although he still weighed only $8\frac{1}{2}$ stones (pre-accident weight $11\frac{1}{2}$ stones). He was reviewed, as a civilian, two years later when he was found to be very fit and weighing just 12 stones. He was at this time working full-time and stated that he had remained free of symptoms sinc: his discharge from hospital in B.A.O.R. An intravenous biligrafin X-ray series done at this time showed a normal gall-bladder and extra-hepatic ducts.

DISCUSSION

Diagnosis

Injuries of the extra-hepatic biliary tract do not usually cause any diagnostic difficulty when laparotomy has been done. Occasionally, however, no free bile has been seen at operation and the abdomen has been closed with or without drainage. Later the diagnosis has been put beyond doubt by either the development of a biliary fistula or the appearances of jaundice and ascites.

Where no operation has been carried out, the local signs in the early post-traumatic period have either not been considered sufficiently marked to warrant exploration or they have been assumed to be due to liver injury alone. Also, and not surprisingly, the coexistence of other serious injuries has sometimes tipped the balance in favour of a waiting policy. Thus, for one reason or another, the diagnosis has been delayed until jaundice and ascites have both been observed usually towards the end of the first week. Jaundice alone, of course, does not constitute proof of bile-duct injury but its presence should be regarded with great suspicion. It has often been attributed to liver injury but it has occurred in only 4.5 per cent of such injuries compared with 65 per cent of bile-duct tears (Gordon-Taylor, 1957). Also a transfusion reaction should not too readily be blamed for the presence of jaundice. Early peritoneal aspiration would appear to be the only way by which the diagnosis could be expedited in these circumstances (Schaer, Dziob & Brown, 1955) although it is doubtful if this procedure would appeal to many surgeons.

Management

It is generally accepted that, following operations on the biliary tract, the area involved should be drained where it is expected that bile may collect outside the ducts. The reason for this is that free bile, especially if infected, is known to induce dense peri-ductal fibrosis. Therefore, in cases of bile-duct injury, it is imperative that efficient drainage should be established as soon as possible, regardless of whether a repair of the injured duct is carried out as well.

Repeated paracentesis cannot be regarded as adequate drainage even though it is known to have been successful occasionally. McCredie (1957) has recorded an instance of this where the patient, a child, was operated on five hours after injury. The only abnormality seen was a hæmatoma of the lesser omentum and nothing definite was done. Jaundice and ascites developed on the eighth post-operative day and from then on the treatment was repeated paracentesis. By the eighth week the jaundice and ascites had disappeared and the child was still well four years later. Obviously the bile-duct injury and subsequent scarring must have been minimal here and indeed it would seem unreasonable to expect aspiration, which must always be an intermittent and incomplete form of drainage, to cope alone with anything more than a small tear in the bile-duct. Also such a method of drainage must inevitably carry with it the risk of serious secondary infection, a risk which is well illustrated by the case now described in this article.

Undoubtedly the proper management is to carry out laparotomy as soon as the diagnosis is thought to be reasonably likely. If no free bile is seen, the presence of a hæmatoma in the lesser omentum should be regarded with great suspicion and this area drained. If bile appears later and if the loss does not stop within a short time, a second operation should be carried out with a view to determining the source of the leak and dealing with it appropriately. Should the loss stop and then be followed by jaundice, early operation is again indicated. It may still be possible to effect a satisfactory repair of the injured duct as in the case described by Baty (1956).

If, on the other hand, free bile is found at the exploratory operation and the source can be readily visualised, every endeavour should be made to carry out a primary repair of the injured duct. Should a primary repair not be considered feasible, either because of the hazards associated with a dissection in ædematous tissue or because of the length of time which must be devoted to more important injuries, then some form of drainage should be established. Gall-bladder and common bile-duct drainage have the advantage of decompression which may help considerably in the spontaneous healing of an incomplete tear. Indeed, Morton, Hinshaw & Morton (1957) state that it is usually only necessary to institute gall-bladder or common bile-duct drainage alone and that direct repair, either primary or secondary, is very rarely required. This would appear to be an unreasonably optimistic view, and also a misleading one if it means that a surgeon might miss the opportunity to carry out a straightforward primary procedure only to find that a more complicated and perhaps less satisfactory one is required later. Gross (1953) goes further and recommends

only simple drainage in the first place. His view is doubtless justifiably coloured by the technical difficulties of repair and intra-ductal drainage in children due to the smallness of the structures concerned, but the method of splint-drainage, the successful use of which has been described by Mason, Sidbury & Guiang (1954), has much to offer here.

The methods of drainage recommended are as follows:

- (1) Common bile-duct using a T-tube with one limb passed beyond the suspected source of leakage. This is the ideal way.
- (2) Cholecystostomy only if (1) is not possible. Subsequent management of both (1) and (2) is dictated by cholangingrams.
- (3) Simple drainage of the injured area. Only if both (1) and (2) are not possible.
- (4) Splint-drainage. Intraductal drainage using polythene tubing introduced via the gall-bladder combined with a repair in cases where the ducts are very small.

It is not within the intended scope of this article to discuss in detail the technique of bile-duct repair, but three well-tried methods are listed below and it is considered that these should cover most contingencies.

- (1) Simple suture with T-tube drainage for an incomplete tear.
- (2) End-to-end anastamosis with T-tube drainage for a complete tear.
- (3) Cholecyst-enterostomy or choledocho-enterostomy with entero-enterostomy for a complete tear where end-to-end anastamosis is not possible.

SUMMARY

The history of a patient with a closed injury of the biliary tract is recorded. Although the tear was never seen it was presumably incomplete since the patient made a full recovery without operative repair of the injured duct being done and has remained well for two years. Nevertheless, his convalescence was stormy, being complicated by serious infection, and it is believed that early intervention would have resulted in a much less hazardous course.

The difficulties of early diagnosis are discussed. To be fully aware of the possibility of an injury to the biliary tract in all upper abdominal injuries is probably the only satisfactory answer to the problem.

The various forms of management available are considered. Early laparotomy is advised and, whenever possible, primary repair of the injured duct. For cases in which primary repair is not considered feasible, the suitability of several types of drainage is discussed.

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THE ASSOCIATION OF MEDICAL DISCHARGES FROM THE ARMY WITH INITIAL GRADING

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The object of this paper is to show the association between initial Pulheems grading and eventual medical discharge from the Army, thus taking the study further than an earlier analysis (Rosenbaum, 1957) which confined itself to discharges in the first weeks of service only. These included some for non-medical reasons, and some below the acceptance standard for service, who were not however allotted a category of 8 in the Pulheems records by a full medical board. The present paper is concerned only with full medical discharges, i.e. invalidings, and their occurrence at any time during service; the scope is therefore a good deal wider.

The question was first raised in connection with Grade III men,* who were called up for National Service but not enlisted as Regulars. It was clearly useful to know how these men, who started with some physical handicap, fared in their service life; the whole emphasis in the past lay on making full use of all resources in manpower, at practically any cost. It was interesting to enquire at what cost, and in the event the answer was so staggering that the employment of Grade III recruits had to be reconsidered and their call up eventually ceased.

The method of enquiry was to obtain an estimate of the intensity of the association between initial grading and discharge, and to discover whether there was a relationship in kind between the cause of discharge and the primary disability.

The high rate of discharge in Grade III

An initial random sample was drawn of the medical histories of 125 soldiers discharged on medical grounds (by a medical board) from 1952 until mid-1953. It was found that reliance could not be placed on knowing whether the man was doing his National Service purely or was a Regular. Therefore the sample included both National Service men and young Regulars of less than two years' service.

An examination of the intake documents in this sample (Table 1) showed the numbers who had been Grade III on entry into the Army; a few cases were included who were given this grade only at the end of training. The only other attribute that was noted, was whether the discharge had been on psychiatric grounds; this was done because psychiatric cases form the largest single group

[•] Grade III is a classification used by the Ministry of Labour and National Service and is equivalent to a category below 3 in any PULHEEMS quality except M when it is below M2. Grade II, referred to below, implies a category of 3 in any quality except M. Grade IV means a category of 8 in any quality, or one below M3 or S3. (Vision is not considered in this paper.) A full description of these grades is given by Rosenbaum (1957).



that is discharged, and it would serve to validate the sample if the proportion of such cases was within the expected limits known from other sources.

(Number of cases)								
		l	Grade III on Entry	Above Grade III	Total			
Psychiatric		י	13	27	40			
Others	•••	!	25	60	85			
Total			38	87	125			

Table 1. Random sample of medical discharges
(Number of cases)

The control is satisfied, with a figure of 32 per cent discharged on psychiatric grounds (Report on the Health of the Army for 1951 and 1952 (1954)).

It may be observed that one-third of the Grade III men were also discharged on psychiatric grounds, but though there is no evidence of a difference, it may well be that the causes are very dissimilar, and that compensating factors cause the final proportions to be alike.

From Table 1 it can be deduced that 30 per cent of those invalided had been Grade III, an estimate subject in this sample size to a standard error of 4 per cent. Thus it is significantly and substantially greater than the proportion of Grade III men who came into the Army, namely between 5 and 6 per cent. Hence the estimated rate of discharge is five or six times as great among the Grade III men as the over-all rate.

Since the annual discharge rate was about $1\frac{1}{2}$ to 2 per cent of strength, that for Grade III must have been between $7\frac{1}{2}$ and 12 per cent, so that in their two years of service, double this figure, or 15 to 24 per cent of the entrants were medically discharged, that is, roughly one in five.

It obviously became worth considering whether this extravagant use of manpower could be prevented, and the fields for saving were shown in the earlier analysis to be among the M3s (the mentally dull) who formed the largest single group among the Grade III, the P5 and 6 (those restricted to temperate climates) and the P3L7 (those with marked foot trouble). It was in fact decided to prevent further entry of the M3s as a first step, and later on the remainder of Grade III.

Analysis by PULHEEMS Categories

A second sample was taken of medical histories of soldiers discharged on medical grounds; these were National Service men only, without the addition of young Regulars. This sample, which numbered 325, was drawn some months later than the first one, and in the meantime the population could have altered its characteristics somewhat.

An adjustment for the Regular element leads to an estimated figure of at least 26 per cent who had been Grade III on entry, as compared with the proportion in the first sample of 30 per cent; the difference is not significant under the hypothesis of an unchanging population, though it may be real.

In Table 2 the sample is summarised according to the causes of discharge, on the basis of a PULHEEMS award of degree 8.

	Grade III on Entry	Above Grade III	Total
Discharged under P	57	115	172
Ü	1	5	6
Ĺ	14	28	42
Ĥ	2	5	7
H M	5	5	10
S	15	73	88
Total	94	231	325

Table 2. Reasons for discharge in a random sample of National Service men
(Number of cases)

There is some uncertainty in this table, in that an estimate has been used in splitting the first line P to allow for the categories P4, 5 and 6 (see below under "Climatic Restrictions"). Also there is some doubt in the last line S about the possible combination in some cases of the category S3, which does not in itself rank as Grade III, with a low rating in another quality. It may be noted that the proportion of psychiatric discharges, at 27 per cent, is smaller than the 32 per cent of the earlier sample, perhaps reflecting the trend in time shown in Reports on the Health of the Army.

As the above table stands, it shows the preponderance of causes for discharge but it does not reveal how these are connected with earlier disabilities. For those who entered as Grade III (other than P4, 5 and 6), and the S3, this can be taken a step further. Thus 22 P8 discharges (the first item of 57 in Table 2, less the estimated P4, 5 and 6 entry) had entered with disabilities varying from L7 (7 of them) to H7 (just one). From another point of view, we can summarise the discharges on the basis of a single low quality on entry, for example, of the two who were U7 on entry, one was discharged as U8 and the other P8. A two-way table presents both views compactly (Table 3).

Table 3. Category of discharge related to category on entry in a sample of National
Service men
(Number of cases)

Entry		Discharge							
	P8	L'8	L8	H8	M8	S8	- Total		
P7 L'7	3	1		1			4 2		
1.7 H7	7		14	. 1	1	1	22		
M3	10				4	14	28		
Grade III	22	1	14	2	5	15	59		
S3	4		1		3	19	27		

114 Association of Medical Discharges from the Army with Initial Grading

It is seen that of the 22 discharges who had been L7 on entry, almost twothirds went out also under L. It was found on investigation, that of the other 28 discharges under L, who had come in as Grade II or better, as many as 13 had been L3 on entry, indicating that a powerful factor at work is the deterioration of a given condition.

The strong association of M3 and S8 was already established in the earlier analysis but a comment is called for regarding S3. There were 88 discharges in all for psychiatric reasons, and 19 of them had entered as S3, possibly in combination with another factor. This is additional evidence that a soldier's chief weakness is the disability he commences his service with, which is a natural enough finding but required demonstration.

We may now extend to this detailed breakdown the reasoning applied earlier to show that Grade III in general had a high discharge rate of five or six times the average. Allowing for the Regular element in the intake by relating the above figures to a total of 370, we find their proportions, and compare them with like proportions for the intake. P4, 5 and 6 are omitted, since we are using an estimate; an account of this category will be found below. Standard errors are given for the sample on account of the small numbers in some grades. The intake percentages are based on a large series and standard errors would be small (Table 4).

Table. 4	Certain categories as a	percentage of	intake, and of	subsequent discharge
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		Per cent Discharges	Per cent Intake	Ratio
Entered	P7 U7 L7 H7	 $\begin{array}{c} 1.08 \pm 0.54 \\ 0.54 \pm 0.38 \\ 5.95 \pm 1.22 \\ 0.81 + 0.47 \end{array}$	0.37 0.05 0.70 0.11	$\begin{array}{c} 2.9 \pm 1.5 \\ 10.8 \pm 7.6 \\ 8.5 \pm 1.7 \\ 7.4 + 4.3 \end{array}$
	M3	 7.57 ± 1.37	1.94	3.9 ± 0.7
	S3 L3	 7.30 ± 1.34 3.51 ± 0.95 plus	1.41 4.24	5.2 ± 1.0 0.8 ± 0.2 plus

The percentage for L3 is based on the number discharged as L8; others entering as L3 may have been discharged as P8 or S8 perhaps, so that this is a minimum percentage. Owing to the different sources of data for discharges and intake, some of the above ratios may be too low. The only category it may affect seriously is that of P7, where the ratio may conceivably be too small by a factor of 2. These factors bear out the continued effect of early low grading, already noticed (Rosenbaum, 1957) during selection procedure; the chief difference is that P7 and U7 are no longer so outstanding, and are therefore apparently dealt with in the very early stages of service, whereas the other categories take somewhat longer for all the disabilities to develop.

Disabilities of the lower limb

As an example, we can look at the L7s and see how long the man was serving before he was admitted to hospital, leading to eventual invaliding.

Table 5. Length of service on admission to hospital of discharged National Service men who enlisted as L7

Discl	narged	-1	-2	-3	-4	-5	-6	7	-8	-9	-10
P8 L8		3 4	1 2	2		2	1 3	1 1		1	
S8											1

Length of Service in Months (completed)

Table 5 shows a rather concentrated number during the period of initial training, about half in the first three months. No cases were discharged during the second year of service. The majority of the L8 discharges were for flat foot (5) or club foot (4). The P8 discharges, which on entry had also suffered mainly from malformations of the foot, were to some extent aggravations of the original condition, apart from two which were completely unconnected. Otherwise the relations were as follows:

Entry Disability

Cause of Discharge

Kyphosis—flat foot

Pes planus

Pes planus

Hammer toe

Cartilage

Cause of Discharge

Scheuermann's disease

Pes planus (effects of)

Hyperhidrosis, feet and hands

Peroneal muscular atrophy

I.D.K.

Additional knowledge of foot troubles has been gained by a survey of 120 recruits who were called up as L7. They were examined before the end of training to see what their disposal should be, and at this stage 14 per cent were to be invalided. Some of these recruits were assessed after only two weeks primary training, so that the figure can be assumed to be in some degree underestimated. It is also noteworthy that half of the sample were to be upgraded on being posted to their unit.

The list of causes underlying the original PULHEEMS assessment is an indication of the disabilities in the initial population of recruits, which could conceivably have been different from the causes listed above, tied as they are to discharges, since certain conditions might lead to discharge more readily. It will nevertheless be seen from Table 6 that deformities of the foot form the largest group as in the L8 discharges. Their proportion of the total is 61 per cent $\pm 4\frac{1}{2}$ per cent. There is no evidence that they form a higher proportion of the invalided group in the table.

International	5:	Dispo	Disposal during training					
Code No.	Disease	Invalided	Posted L7	Upgraded	Total			
081	Effects of poliomyelitis	1	1		2			
225	Exostosis of ankle	1 -	-	1 1	ī			
351	Spastic hemiplegia	1		-	1			
460	Varicose veins		2	3	5			
463	Old thrombosis of calf			1	. 1			
709	Severe foot callosities			1	1			
712	Ingrowing toe-nail			1	1			
730	Osteomyelitis		2	1	3			
732	Osgood Schlatter's disease		1	1 1	1			
734	I.Ď.K	1*	3	4	8			
735	Old disc lesion		1	1 1	1			
738	Other diseases of joint		1	2	3			
744	Muscle wasting			1	1			
746	Flat foot	6	10	16	32			
747	Hallux Valgus	1	2	1	3			
748	Clubfoot	4	2 8 3	10	22			
749	Hallux rigidus	. [3	10	13			
749	Other deformities of foot	į.	2	1	3			
749	Short leg	1	1		2			
758	Congenital dislocation of hip		1		1			
789–795	Symptoms and ill-defined con-							
	ditions	. 1	1	4	6			
N823-N996	Injuries	1	4	4	9			
		17	41	62	120			

Table 6. Causes underlying initial assessment of L7

Apart from the foot deformities already noted, the largest group is composed of osteomyelitis and other diseases of bone and joint, with cartilage trouble of the knee as a main contributor. There is also a sizeable group with varicose veins.

So far we have examined the causes of being initially grade L7, and of eventual invaliding after such an initial grading. These are not necessarily the same as for all National Service men, including those better than Grade III, who are discharged during their service as L8; in fact 29 per cent of them are discharged on account of injuries (mainly leg fractures). This was discovered in a complete analysis of L8 discharges over a whole year, obtained from a wide coverage of likely diseases. Even excluding injuries, the foot deformities composed a smaller proportion, about 40 per cent, of the discharges due to disease, while the osteomyelitis group (including other bone diseases) was responsible for almost a third of the discharges. It remains true that L8 invalidings for disease are concentrated in the first year of service, half of the grand total being in the first four months; there is only one exception, namely when the cause is a prolapsed intervertebral disc.

Referring again to the random sample of 325, the question of length of

Discharged on psychiatric grounds.

service was followed up for a sub-sample of the recruits who had been better than Grade II on entry. Among the P8 and S8 discharges, the service was as follows, on admission to hospital (Table 7).

Table 7. Length of service on admission to Hospital of discharged National Service men who were above Grade III on enlistment

			-				-			
Discharged	i	-3	-6	_9	-12	-15	-18	-21	24	Total
P8 S8		12 5	15 5	13 6	4 3	3	1 2	3 0	1 1	52 23
		17	20	19	7	4	3	3	2	75

Length of Service in Months (completed)

Here once more is seen the concentration in the first year of service, though not necessarily in the first months. A similar distribution was observed for the discharges of those recruits who had entered as M3.

Climatic restrictions

To supplement the information above, we require to know about the PULHEEMS grades P4, 5 and 6 which reflect the ability to serve in tropical climates. It was found in a sample of National Service men that 3.9 per cent \pm 0.8 per cent had been P4, 5 or 6 some time during the earlier part of their service. Including also some Regulars and some whose type of engagement could not be determined, the reasons for these gradings were stated to be as follows (Table 8).

Table 8. Cause of P4, 5 or 6 grading in a sample of soldiers in 1955

titis media an	a exte	ilia, all	u omer	ear co	numons	•••
sthma	•••	• • •	•••	•••	• • •	• • •
ye conditions	• • •	• • •	•••	•••	•••	• • •
yperhidrosis			•••	• • •		
ther condition	S					

Following the same procedure as before, it was found in a further sample of 162 medical discharges of National Service men that 18, or 11 per cent $\pm 2\frac{1}{2}$ per cent, had been P4, 5 or 6 in the first stages of service. Hence the estimate of the likelihood of discharge is 2.8 times that for the average recruit. This is about the same as already estimated for the minimum value of the category P7.

Among these discharges, the causes of the original P grading were similar to the intake but with a greater emphasis on asthma (6 cases); there were 5 with skin conditions (one combined with asthma), and 2 with ear conditions. Just as with the L quality, so here there is evidence of a deterioration of the initial condition, for among 14 cases where it was possible to trace the whole history, 11 were discharged for the same disability which had led to their low grade on entry.

Summary

By employing random samples from the medical discharge documents, and relating them to the analysis of PULHEEMS on intake, discharges among the lower grades were compared with the average for all recruits, and as an example, Grade III men as a whole were found to be five or six times as likely to be discharged.

There was a marked concentration of medical discharges in the first year of service for all recruits, and even in the first months of service for those with an initial disability affecting the lower limbs. A detailed analysis of the latter showed that foot deformities (flat foot, and club foot mainly) were a leading cause, followed by osteomyelitis and other diseases of the bone. A potent factor in these discharges for disease of locomotion was the deterioration, or perhaps reassessment, of a given condition, extending to Grade II recruits even, who had commenced as L3. A similar factor was at work with those National Service men whose stability was below average, and who were eventually discharged for psychiatric reasons, and also with those whose service was restricted to temperate climates by reason of skin troubles, asthma and ear conditions.

It would appear that the economic cost to the country of calling up these lower grade men for National Service is extremely high, although there may be a recompense to those individuals (still the great majority) who stay the full course, and may derive benefit from their service. Although we now know what happens to these young men when they are called up, we cannot tell what might have happened to them if they had remained civilians; that is to say in a period of two years, how many would have deteriorated in condition sufficiently to be described as Grade IV, and so on. Without such a comparison, it remains controversial to claim that National Service for the lower medical grades is "a good thing" or "not a good thing."

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WESTERGREN VERSUS WINTROBE

BY

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THERE has been considerable discussion in the past regarding the rival merits of Westergren and Wintrobe methods of estimating the erythrocyte sedimentation rate (E.S.R.). Most authorities are agreed that Westergren's method is the more accurate and reliable (Sinton, 1948). Wintrobe's method was found on occasions to give low values in cases with marked clinical evidence of active disease and where the Westergren values were greatly raised (Gilmour & Sykes, 1951; Goldberg, Glynn & Bywaters, 1952). However, Wintrobe's method is still used routinely in a number of pathology laboratories. This paper provides a comparison of the two methods performed on 50 samples of blood collected from 46 patients, one female and 45 male, at The Queen Alexandra Military Hospital, Millbank, during the months of June and July 1959.

METHODS

E.S.R. estimations were performed on patients referred for this investigation by medical officers in charge of medical wards. 20 ml. of blood were withdrawn on each occasion, always by the same operator (G.R.T.). 2 ml. were mixed with 0.5 ml. of 3.8 per cent sodium citrate. This was later drawn up to the zero mark in a standard 200 mm. Westergren tube and the sedimentation rate read at the end of one hour. The remaining blood was placed in four glass bottles, each containing sufficient anticoagulant to prevent 5 ml. of blood from clotting, as follows: 3 and 5 ml. volumes of blood were mixed thoroughly with each of the two types of heat-evaporated anticoagulant used—namely, Wintrobe's Mixture (ammonium oxalate and potassium oxalate) and Sequestrene (5 per cent ethylenediamine tetra-acetic acid). Blood from each bottle was pipetted into a 100 mm. Wintrobe tube and the sedimentation rate read at the end of one hour. Thus four readings of E.S.R. by Wintrobe's method were obtained for every one reading by Westergren's method. All estimations were carried out within three hours of venepuncture.

No correction for variation in Packed Cell Volume (P.C.V.) was applied to the readings obtained by Wintrobe's method, since the value of this procedure is debatable. Alston (1946) regarded it as oversimplification of a complex situation to correct only one of the many variable factors influencing sedimentation rate. Davis (1946) stated that attempts at correction might falsify results by over-correction.

RESULTS

For the purpose of this investigation normal values for Westergren's method were accepted as less than 10 mm. in one hour (males), less than 20 mm. in one hour (females) (Westergren, 1957). The same limits of normality were applied

to results obtained by Wintrobe's method. Using these criteria 19 out of the 50 estimations were normal by both methods and will not be considered further.

The laboratory at The Queen Alexandra Military Hospital normally does E.S.R. estimations by Wintrobe's method on 5 ml. of blood collected in a Sequestrene bottle, and in the comparison of abnormal results given in Table 1, the 5 ml. Sequestrene column is taken as the representative Wintrobe value.

Table 1. Comparison of results of E.S.R. estimated by Westergren and Wintrobe methods.

Case Number	r Diagnosis	v	Vestergren		Wintrobe's mixture		Sequestrene	
1 vaimbei	Diagnosis	•	vestergren	5 ml.	3 ml.	5 ml.	3 ml.	
1.	Carcinoma of lung		120	58	59	57	59	
2.	Rheumatic fever		43	36	35	35	37	
3a.	P.U.O		135	43	30	16	30	
b.	**		108	2	12	10	54	
c.	,,	•••	114	36	54	51	50	
4.	Carcinoma of lung		38	38	39	40	41	
5.	Chronic pancreatitis		59	25	13	14	16	
6.	Pleural effusion	•••	50	35	35	32	33	
7.	Ulcerative colitis		21	24	26	24	23	
8.	Pleural effusion		59	41	41	40	42	
9.	Hodgkin's disease		45	46	45	44	45	
10.	Acute tonsillitis		13	26	22	24	27	
11.	Ulcerative colitis		16	19	19	20	19	
12.	Acute myelitis		12	20	20	18	17	
13.	Subphrenic abscess		54	35	34	36	36	
14.	P.U.O		11	15	16	16	16	
15.	Cardiac infarct		18	26	27	26	25	
16.	Carcinoma of lung		72	50	51	51	50	
17.	DILO		26	42	39	38	37	
18.	Aspiration pneumonia	•••	50	30	ĭí	35	40	
19.	Hepatic cirrhosis (female)	•••	36	38	40	37	34	
20.	Hypertension	•••	13	11	9	9	8	
21.	Chronic myeloid leukaemia	•••	11	20	21	24	20	
22a.	() 1: · · · · ·	•••	42	30	29	29	33	
22a. b.		•••	31	37	38	34	36	
23.	Ulcerative colitis	•••	65	41	42	46	44	
23. 24.	Diamond Comm	•••	19	28	24	24	22	
25.	Caminana af luna	•••	125	57	57	55	43	
26.	DUO	•••	23	32	37	33	33	
20. 27.	***	•••	23 89	31	33 29	13	25	
27. 28.	Discussion	• • • •	89 10	10	9	13	25	
28.	Disc lesion	•••	10	10	<u> </u>	12	y	

Cases 3a, 3b, 5 and 27 show marked disparity between Westergren and Wintrobe readings and illustrate the not uncommon finding of a high Westergren and a low Wintrobe value. Also notable in these cases is the disparity between the Wintrobe readings obtained with differing volumes of blood and different types of anticoagulant.

The remainder of the results compare fairly well, if one allows for the fact that the maximum Wintrobe reading is approximately 60, whereas Westergren readings of more than double this figure can be obtained. Analysis of the Wintrobe results shows no significant difference between the two types of anticoagulant used. The Wintrobe readings agree well with each other, except in those cases

where there is a false low reading as judged by the corresponding Westergren value. In each of these cases the Wintrobe values differ markedly amongst themselves in an apparently haphazard manner.

DISCUSSION

Factors affecting the sedimentation rate of red cells are numerous. Davis (1946) in a critical survey made the following points. Sedimentation occurs in three phases: 1, rouleaux formation; 2, rapid sedimentation; 3, slow sedimentation. One disadvantage of Wintrobe's method is that phases 2 and 3 tend to overlap owing to the shortness of the tube.

Rouleaux formation is thought to depend mainly on electrical charges attached to the plasma proteins, of which fibrinogen and the globulins are the most important. Lewi (1954), in a study of the intensity of rouleaux formation and its effect on the E.S.R., found that false low Wintrobe readings occurred where there was intense rouleaux formation in the presence of a normal P.C.V. or normal rouleaux formation in the presence of a low P.C.V. With both these combinations the E.S.R. of undiluted blood as used in Wintrobe's method was low, but not so with Westergren's method, where dilution of the blood cancelled out the inhibitory factors.

CONCLUSIONS

There was fairly good correlation in most cases between the E.S.R. as estimated by the methods of Westergren and Wintrobe. But on four occasions low Wintrobe readings occurred when the Westergren reading was high.

The Wintrobe results obtained with two types of dried anticoagulant indicate no significant difference in efficiency between Wintrobe's mixture and Sequestrene

It is suggested that to avoid false low values of the E.S.R., Westergren's method should supplant Wintrobe's in those laboratories where the latter is still used.

SUMMARY

A comparison was made of two methods of estimating the erythrocyte sedimentation rate on fifty samples of blood. The results tend to confirm the view that Westergren's method is superior to Wintrobe's.

I should like to thank Lieut.-Colonel T. E. Field and his laboratory staff for their generous help and tolerance, and Lieut.-Colonel R. M. Johnstone and the officers of the Medical Division of The Queen Alexandra Military Hospital for kindly providing the subjects of this survey.

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GRANULOCYTOPENIA ASSOCIATED WITH GLANDULAR FEVER

BY

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AND

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An unusual cause of granulocytopenia is described in a patient whose glandular fever was first diagnosed on sternal marrow biopsy.

Case History

A Gurkha rifleman aged 25 years was admitted to the British Military Hospital, Kamunting, Malaya, with a history of retro-orbital headache, muscle pains and nausea for several days. He had not been on jungle patrols for two years, and had taken no drugs recently.

On physical examination, the relevant findings were a temperature of 104° F. and a generalised lymphadenopathy, the glands being discrete and tender. There was neither rash nor enlargement of spleen or liver. Blood count on admission showed a hæmoglobin of 11.8 g. per cent and a white cell count of 3,400 per cu. mm. with 52 per cent polymorphs, 44 per cent lymphocytes and 4 per cent monocytes; no abnormal cells were seen. The following day the white cell count dropped to 1,500 per cu. mm. with only 33 per cent of granulocytes (absolute level of 500 cells per cu. mm.).

Antibiotic cover with terramycin was started and a sternal marrow biopsy performed the next day. The marrow specimen was moderately cellular, the erythroid series being quite normal. Active myeloid tissue was present, in spite of the low peripheral count. The principal feature was the presence of many abnormal mononuclear cells with basophilic-rimmed cytoplasm containing vacuoles and latticed nuclear chromatin. These cells were considered to make a diagnosis of glandular fever probable.

Later, on the day of sternal puncture, the white cell count had risen to 2,100 with 50 per cent granulocytes. The following day the count was the same and a few abnormal mononuclear cells were seen for the first time in the peripheral blood. From this time the patient improved rapidly, all symptoms subsiding and the lymphadenopathy decreasing over a period of three weeks, atypical cells persisting for about the same time.

The leucocyte count rose steadily, being 6,200 per cu. mm. (60 per cent granulocytes) a month after admission, when the patient was discharged in good health.

Comment

Marked leucopenia is an uncommon feature of glandular fever. In only 7 out of 64 cases of Bernstein's (1940) detailed series was the leucocyte count below 4,000 per cu. mm. The lowest count found in the literature is one of 1,500 per cu. mm. reported by Davidsohn (1937).

The granulocyte depression was very transient in the case reported here, the marrow appearances eighteen hours after the lowest peripheral count showing active myeloid regeneration, being followed by a steady rise to normal.

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UNITED KINGDOM ARMY MEDICAL SERVICES ANNUAL EXERCISE

BY

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SUMMARY

The Royal Army Medical Services hold an annual Director-General's exercise which features the latest opinions and doctrine regarding the role of medical troops in modern warfare. The 1959 operation, held 1 to 4 October, was named Exercise Medical "Canaletto" for a Venetian painter of the eighteenth century. He has been called the "Master of Perspective," and it was the aim of this exercise to place medical problems arising from nuclear warfare "in proper perspective." The first day's programme consisted of a series of lectures at the Royal Army Medical College, Millbank, London. The next two and a half days consisted of tactical problems, discussions, and demonstrations at the Field Training Centre, Royal Army Medical Corps, Keogh Barracks, Ash Vale, Surrey. This phase was classified "Restricted" (U.S. "Confidential").

LECTURES (LONDON)

ATTENDANCE at Millbank was restricted to some ninety senior officers of the Royal Army Medical Corps, including the Senior Medical Officers of major commands in the United Kingdom and abroad; several prominent civilian consultants to the Army; the Directors-General, or their deputies, of several other countries, including Denmark, France, the Netherlands, Norway, Turkey, the United States, West Germany, and Yugoslavia; and certain foreign medical liaison officers based in London. The programme consisted of the following major topics: (1) Initial treatment of burns; (2) Nuclear radiation; (3) Isolation and the will to live; (4) Anæsthetics; (5) Surgery of trauma; (6) Arterial grafts.

Initial Treatment of Burns

Treatment within the first twelve hours was discussed by Major A. B. Forage, Royal Army Medical Corps (Burns Research Unit, Chester Military Hospital). This was a conventional discussion of burn physiology and fluid requirements. Water taken with electrolytes by mouth was barely mentioned. Major Forage advocated covering the burned areas with a loose polythene (polyethylene) bag after cutting away burned clothes. Polythene is available as sterile tubing in sizes large enough to slip over a limb or trunk. Arguments presented for the method were: (1) by increasing the local humidity about the burn, evaporation of plasma is reduced and consequently the incidence of shock is reduced; (2) it forms a non-sticking dressing through which the burn may be observed. He also recommended cut-down on veins and insertion of an in-dwelling plastic cannula to a distance of nine inches. He demonstrated a sterile field cut-down package, packaged in polythene.

Mr. R. J. V. Battle, a prominent London plastic surgeon, spoke on the treatment of burns within the first few days. The polythene tubing did not appeal to him. He felt that it was important that a firm, dry eschar form over the burn as early as possible, and that tubing would delay this, with the result that the burn would present a wet, soggy surface prone to infection. He maintained that although potentially desirable, the open method of treatment was not practical in a battle situation. He recognized the undesirable features of porous, sticking bandages, but felt that in the military situation they probably could not be avoided. He advocated investigation for military purposes of sheets of a polyurethane sponge material as a pad under patients with circumferential burns. He is using this material clinically at St. Thomas's and other hospitals; it is readily sterilizable, re-usable, and non-sticking. The Director-General, Royal Army Medical Corps, Sir Alexander Drummond, stated that the polythene bag was not planned for use as a long-term dressing, but only for the evacuation phase.

The next speaker was Mr. A. B. Wallace, an eminent Edinburgh plastic surgeon who is especially interested in burns. He advocated no treatment in the forward areas, but assessment and complete clinical recording at the first rear area. Mr. P. W. Clarkson, Honorary Civilian Consultant (Plastic Surgery) to The Queen Alexandra Military Hospital, Millbank, also had reservations about the polythene bag, believing it would lead to wound cavitation. Major Forage's rebuttal was that the bag had worked well in his cases, provided good protection for the burn, permitted easy painless inspection, and was suitable for both arctic and tropical areas. The lectures and statements by visitors were primarily on treatment of burns; they did not often come to grips with the logistic and other problems relating to mass burn casualties.

Nuclear Radiation

Lieut.-Colonel J. A. H. Brown (Army Medical Liaison Officer, Medical Research Council Radiobiological Research Unit, A.E.R.E., Harwell) discussed the increased importance of gamma and neutron radiation with the advent of

smaller weapons. He stated there was evidence indicating a preferential damage by neutrons to the gastro-intestinal tract and that a high proportion of the casualties from small weapons would demonstrate a choleraic syndrome or a central nervous system syndrome (high dosage). In private conversation later, he stated that the evidence for the preferential action of neutrons on the gut was discussed in a report of the 14th Tripartite Conference (Proceedings on the Biological Effects of Radiation). A study of the report showed that his remarks were apparently based on Upton's mouse data and that the conclusion of the group was that neutron and hard gamma produced approximately the same effects of early (30 days) military significance. The impression left by Lieut.-Colonel Brown, and alluded to several times later in the exercise, was definitely that neutrons predisposed to the gut syndrome. Professor J. F. Loutit (Director, M.R.C. Unit, A.E.R.E.) expressed the opinion that following radiation damage there was no true repair of cells but only replacement. He felt that no prophylactic pill of practical importance to the military would be available in the foreseeable future. He explained the mechanism of action of some protective chemicals by stating that they were substances capable of mopping up the excess hydroxyl ions resulting from irradiation of body water. Professor J. R. Squire (Experimental Pathology, University of Birmingham) thought it possible that we might raise the LD-50 from the neighbourhood of 500 rem to about 1,000 rem with known agents, although they would also cause hypothermia and this might be undesirable in combat personnel. He felt that in regard to internal contamination we have been devoting too much attention to Strontium 89 and 90 and not enough to Iodine 131, and suggested that potassium iodide might be a useful drug to eliminate Iodine 131. For acute radiation sickness he advocated early phenobarbitone (phenobarbitol) and possibly artificial hypothermia. He advocated chlorpromazine and perhaps pyridoxine for vomiting. advised care in using salicylates and cortisone because of their tendency to increase capillary permeability. He advocated early penicillin for control of infection, with other antibiotics being reserved for later infections. He proposed neomycin in the "choleraic syndrome" for sterilization of the gut and gamma globulin at a rate of .02 g. per kg. per week; that is, about seven grams per week for an average patient. He felt that the high incidence of hepatitis virus in the population made transfusions something to be undertaken with caution; platelet transfusions might become a practical and fairly common procedure, but platelet typing would have to be explored. He mentioned marrow transfusion and "secondary sickness" (delayed reaction to marrow homografts).

Isolation and the Will to Live

Three talks were presented, two on overwintering experiences in the Antarctic and one on raft survival in the Indian Ocean. Their Antarctic experiences (Colonel R. A. Smart, Major J. M. Adam) with groups of about twenty men emphasized the importance of prior knowledge of the medical history of the personnel and the value of pre-selection. They felt it was dangerous to extra-

polate the experience gained with the highly selected groups of personnel in the Antarctic to average military personnel. In short, they had few serious problems. Lieut.-Colonel E. M. Turner, Q.A.R.A.N.C., was the sole survivor of two successive sinkings of ships evacuating personnel from Singapore in February 1942. She spent four days without food or water on a one-man life raft in the Indian Ocean. During this period some fourteen of her companions perished. She then spent the balance of the war as a Japanese P.O.W. The most difficult period was a six-month jail sentence with another woman in a small cell four paces long. They were permitted only two five-minute exercise periods per day outside the cell. Methods of combating boredom during this period included playing checkers with stones on the floor and taking long walks inside the cell, during which she and her comrade imagined they were "walking the leafy lanes of England, with a fine meal at the end of the stroll in a country inn." Group methods of combating boredom at a later period included playing cards and mah-jongg with home-made sets, and concerts with various individuals humming different instrumental parts. She attributed survival to: (1) self-discipline; (2) contempt, rather than active hate, of their captors; (3) religion; (4) an implicit belief in ultimate rescue. Brigadier E. A. Bennett (late Consulting Psychiatrist, India Command) wondered why one should be alarmed at isolation. He stated that for many personality types isolation might prove a welcome interlude. He stressed the extreme value of self-discipline and said, "The job of a soldier is to fight and, if necessary to fight alone." Brigadier G. W. B. James (late Consulting Psychiatrist, Middle East Forces) stressed selection on the basis of personality for missions in which capture and isolation were serious considerations. He felt that the oral type (in the analytic sense) were poor risks and gave up too easily. The compulsively meticulous individual who was loath to delegate authority was an excellent risk for long periods of isolation. He was frequently a good leader for small isolated groups. Chaplain-General Pike, as might be expected, stressed the role of faith in a supreme being as a strong aid to survival.

Anæsthesia

Colonel K. F. Stephens emphasized the urgency of a simple, safe method for giving short anæsthesia to large numbers of patients. He introduced Dr. J. G. Bourne of St. Thomas's Hospital (London) who described some clinical experiences with a mixture of cyclopropane, oxygen and nitrogen, which Bourne considered an excellent anæsthetic. Colonel Stephens then demonstrated a simple device consisting of two sparklet pressure bottles charged with 50 per cent cyclopropane, 25 per cent hydrogen, and 25 per cent oxygen. These bottles were placed in a very simple dispenser and used to charge a standard six-litre anæsthesia bag attached to a standard child-size soda lime cylinder, a two-way valve, and a standard face mask. He stated that in this mixture cyclopropane was not explosive. He has trained a large number of dental technicians and other personnel to use this apparatus successfully after only 15 minutes of indoctrination and illustrated this with a short film. After the bag is charged, it

is held on the face for $3\frac{1}{2}$ minutes (by egg-timer); the patient is ready for operation $1\frac{1}{2}$ minutes after application of the mask. The procedures allow about five minutes' operating time. If it is necessary to prolong the operative procedure, the bag is refilled and applied to the patient again when the first reflex movements appear. His arguments for cyclopropane were: (1) since it is poorly soluble in blood a concentration is quickly reflected in the tissues and induction is very rapid; (2) since it is a weak anæsthetic, anæsthesia "accidents" are not encountered. He presented in detail arguments against gas-oxygen-ether, chloroform, open drop ether, and thiopentone (pentothal). He stated that the device is undergoing clinical trial at present, and he hoped to have better than a thousand cases to report at the next meeting. For combat he would recommend a 40 per cent cyclopropane, 30 per cent oxygen, 30 per cent nitrogen mix. A corpsman could carry sufficient gas for 50 patients in his haversack. Professor R. F. Woolmer, an eminent anæsthesiologist, reminded the audience that it has been only 150 years since troops with Wellington were routinely operated without anæsthesia, and that in the event of a mass casualty situation it would probably be necessary to consider this possibility. In regard to Colonel Stephens' objections to chloroform and ether by the open drop method, he stated that anæsthesia could be successfully administered by alternating chloroform and ether in this method. Dr. R. W. Cope felt that cyclopropane was "on the way out" clinically and recommended the use of a muscle relaxant and thiopentone (pentothal).

Surgery of Trauma

Major-General I. Papo (Consulting Surgeon, Yugoslav Army) detailed the history of surgery for war wounds and recommended initial wide excision of devitalized tissue with delayed primary suture at four to seven days. He emphasized the dangers of early primary suture of wounds. Comments of the several consultants and General Papo's talk on arterial grafts were not heard by this observer.

PROGRAMME AT ASH VALE

The theme was to study the "collection, evacuation, and management of casualties within the combat zone." Attendance at the Field Training Centre, Ash Vale, Surrey, was approximately 200. Officer personnel from the first day were augmented by representatives from other Corps of the British Army, senior medical officers from various home commands, and about forty senior reserve medical and dental officers (Territorial Army). To avoid classification of this report, it may be simply stated that the situation involved defence of an area containing several cities in 1965. Aggressor troops were assumed to possess tactical air superiority and to possess and employ tactical nuclear weapons. The ground situation in one sector was depicted on a large scale floor relief map which showed deployment of forces, weapons, vehicles, medical facilities and medical personnel.

Field Demonstrations—First Day

- (1) Two infantry companies deployed for nuclear combat. Realistic simulation of several small weapons detonating. Object was to demonstrate dispersal and effective range of small-weapons effects.
- (2) Static demonstration: A shallow dug crater with field tape outlining isodose contours at H+1. This was of doubtful value since neither size nor height of burst was specified. General reaction: "This is no worse than a conventional munition."
- (3) A demonstration of hasty decontamination of troops. Outer clothes removed and shaken, vigorous dusting of personnel. Mouths and noses were covered with wet handkerchiefs.
- (4) A field messing demonstration, with field kitchen dug in. Equipment and stores did not compare favourably with similar U.S. gear.

Immediate Medical Care and Evacuation—Discussion

It was estimated that the nuclear strikes promulgated in the problem would cause approximately 500 casualties, with about 300 litter cases. Considerable discussion arose over the desirability of retention of a medical unit roughly equivalent to a WW II U.S.M.C. Regimental Clearing Station about 10 miles from the contact area. About half the groups felt that evacuation should be from small forward aid stations direct to far rear (20-40 miles). The others believed that air evacuation could not be assured and that such an intermediate station was essential. Comment: Little reason to discuss in detail, since British medical deployments, manning levels and logistic support are not directly comparable to Fleet Marine Force. It is felt that the following points were neglected: (1) It was assumed that medical facilities would escape fallout. (2) Prompt enemy exploitation was excluded. (3) Roads and bridges to rear were considered open (despite enemy air superiority). (4) Effect of civil population on military movements was not included. They made the following points: (1) It might be four hours before organized collection of the wounded could commence. (2) Present allowances of litter-bearers are inadequate. (3) The area must be cleared of the wounded as soon as possible to permit a nuclear counter-attack. Discussion of this immediately post-strike phase was unfortunately curtailed.

The "Hovercraft"

This device was discussed by representatives of the builder, Saunders Roe Ltd. It is a saucer-like airborne craft which hovers approximately 18 in. off the ground and is supported on a cushion of air provided by two concentric rings of air jets. Forward motion is accomplished by interrupting the rear wall of the curtain and allowing cushion air to escape. Directional control is obtained by mounting rudders in ducts through which air is pumped from the main plenum chamber. Several models of the device have been built, and one prototype roughly 20 feet in diameter. It was stated that the lift capacity of the prototype was 20 men. The presently installed power plant (Leonides aircraft

engine) cannot raise the device more than one and a half feet; it is feasible to get lifts to about 4 or 5 feet, but this is very expensive in terms of power. Forward propulsion is also expensive, but hovercraft-principle platforms without the ability to manœuvre are very economical in power. Trains of such platforms, towed by a wheeled vehicle or a manœuvrable hovercraft, should be feasible because of the very low frictional component between the hovercraft and the ground. The films showed a definite spray problem over water. The ability of the craft to make the water-shore transition is at present limited by the slope of the beach, and the demonstrations were all on very flat beaches. The craft cannot cope with barriers 3-4 ft. high. The design is certainly of great interest for flat or rolling open country, marshes, lakes, frozen tundra, etc. The ride appeared very smooth, with the air cushion supplying a very effective damping action. Side-by-side contrast with a military ambulance traversing the same terrain was dramatic. In situations in which the craft can be used the wounded men would endure far less jolting than in a wheeled vehicle or boat.

Later there was a live demonstration of a one-third scale model (radio controlled) over water. The extremely small amount of push needed to send the model skimming for great distances was impressive. It was evident that very little motive power would be necessary to pull a string of such platforms.

Demonstration "March of Progress"

A fine spectacle demonstrating with original uniforms, equipment, documentation, and skilled acting, the military evacuation of patients from circa 1800 to the present. It is amazing that until recent years any patients survived. Current R.A.M.C. ambulances were not impressive. A three-ton very large box type (said to be underpowered) carried only four patients. To convert jeep-type vehicles to ambulances, special struts are installed which result in much greater litter overhang than on the U.S. type. In the field demonstration there seemed to be a definite whip action as a result of the long overhang. Nothing equivalent to the "mechanical mule" was demonstrated; the only advancement seen over WW II was conventional helicopter lift.

Survival and Rescue at Sea

A Royal Navy seminar, consisting of Surgeon-Captain Baskerville, Surgeon-Lieut.-Commander O. Rawlins, and Surgeon-Lieut. T. Barrington, and using the historical approach, presented some excellent and appalling examples. The value of discipline was pointed up by contrasting two sinkings off West Africa. In 1816 almost 75 per cent of a large group with adequate stores perished in four days (wine, sun and mutiny). In another most of the crew of an overloaded open boat survived a three-week trans-Atlantic crossing because of disciplined rationing of stores, etc. Current designs of British life jackets and immersion suits were demonstrated. It was stated that survival in cold water was enhanced if the occiput could be protected from chilling. A standard solar still capable of supplying 4 oz. per hour was shown, as well as a miniaturized combination radar beacon and the short-range transceiver for downed aviation

personnel. The myth of squeezing raw fish to provide water was effectively exploded; using several fresh fish and a large screw-jack press, only very small amounts were expressed.

The audience then moved out to a nearby lake where all equipment discussed in the seminar was demonstrated "live." The Royal Navy 20-man inflatable life raft has several inflatable ribs supporting its canopy. A helicopter was able to home on the portable radar beacon, and rescue was facilitated by direct conversation on the transceiver between downed pilot and cockpit. Two methods of pick-up were demonstrated: a scoop net and a sling.

Radiation Casualties

Lieut.-Colonel H.Whitcher, R.A.M.C., presented a review and summary from the viewpoint of the field surgeon. It was stressed that gamma and neutron were the principal casualty-producing radiations, although some beta burns might be seen. Chemical prophylaxis might be very worth while, even if it raised the LD-50 only by a factor of two. Colonel Whitcher emphasized treatment on the basis of presenting symptoms and not on the basis of dosimeter readings. He pointed out that present knowledge furnishes no guides to treatment other than empirical and supportive. He pointed out that gut symptoms were the important ones to the forward area surgeons, and emphasized evacuation priorities. Comment: Remarks on this point were consonant with U.S. military practice. At the present time the British Army does not have field combat personal dosimeters. Whether or not they will procure and issue large numbers (as U.S.N. and U.S.A.F.) or only a few per unit (as U.S.A.) is not decided. There is much emotional opposition to segregating "expectant" (i.e., probably non-surviving) patients.

Forward Surgical Team Equipment—Current, Transitional, and Future

A helicopter demonstration showed that the transitional gear could be transported in three medium helicopters which could all be off-loaded into jeeps and jeep trailers in less than five minutes. The present gear is not designed for airlift, weighs approximately four tons and is packed in a miscellaneous assortment of wooden crates and boxes. A great many items have been declared excess or outmoded and are being deleted, such as the gas-driven electric generator. It is now felt that the forward surgical team will be used to augment an existing medical installation; power and certain other "housekeeping"-type services will be provided by that facility. Galley equipment has been deleted on the same premise. Kerosene-fueled primus stoves have been deleted in favour of gasoline-operated devices. The field autoclave is deleted and has been replaced by a German patent chemical method ("Tego"). Operating linen has been replaced with plastic drapes and gowns, to be sterilized in "Tego." "Tego" is a liquid and said to render items sterile in 2 hours at 80° C. or overnight at room temperature. It is said that a coating of the material on the hands makes gloves unnecessary. It has had some ten years of clinical trial in Germany, and it is claimed that skin hypersensitivity has not been a problem.

A rather cumbersome suction apparatus has been replaced with a small foot-operated device which appears rugged and efficient. The conventional anæsthesia machine has been replaced by the EMO anæsthetic outfit which is a compact ether/air inhaler suitable for face-piece or endotracheal tube. This outfit has apparently had considerable clinical trial and has proved entirely satisfactory. Cyclopropane and nitrous oxide and oxygen cylinders have also been deleted. Assorted surgical dressings are now pre-packed, pre-sterilized and supplied in cardboard cartons. The assorted wooden crates and cases have been replaced with wicker hampers, rather like square laundry hampers. All the gear has been packed so that any component can be lifted by two men. Weight has been almost halved. Future developments include further streamlining; probable replacement of wicker baskets by plastic; replacement of bottled liquids by liquids packed in collapsible plastic containers, etc. Comment: There was very little use of aluminium. I would say that except for the EMO anæsthesia outfit and the "Tego" sterilizing method, airborne surgery equipment of U.S.A.F. is considerably ahead. I saw no packaging that compared to present U.S. standard aluminium field medical kits. I do not know whether we have adopted the idea of units of assorted surgical dressings for supply and resupply; this looked very good. It was stated that the assortment was based on actual usage rates.

Seminar and Discussion—The Clearing Station ("Advanced Dressing Station")

It was assumed that by H + 16 some 70 per cent of the casualties resulting from the initial strike and from subsequent night probing action had reached stations roughly comparable to WW II regimental clearing stations. A proposed distribution of medical personnel and flow patterns was presented; it was fairly conventional. It was felt the professional teams could cope with the casualty situation for about five hours at maximum speed. No equipment such as wheeled Gurneys was available and the weak point of the dressing station was in litter bearers. Treatment of lying cases could involve three or four internal transfers from area to area. This threw a load on the litter-bearers organic to the station which could not be met without additional help. There was a sharp divergence of opinion over disposition of those patients who had recovered from their initial vomiting, or who were not seriously incapacitated by it. There are apparently no plans for decontamination prior to this station and only very vague ideas as to what skin levels should be considered for decontamination at this point. It was felt that shortage of water would preclude washing and that decontamination would consist mainly of brushing. Visitors' comments were that most fallout material initially present would have been bounced off the patient by the time he got to this station. There was considerable opposition to the multiplication of radiac equipment. There was lively discussion over the role the doctor should take in furnishing advice on radiation to the C.O. The impression was made that C.O.s at present have few, if any guide lines. There was a talk of adding "a scientific officer" to command staffs.

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Evacuation to Rear

Several analyses were presented of the number of patients organic medical vehicles could transport. A rather discouraging view was taken of the number of helicopters available to the field surgeon in 1965, although even this limited number accounted for the greater part of the patient lift. Various line, transport, etc., officers spoke of the emergency transportation available to the M.O. While the transport officers indicated that very adequate numbers of vehicles would be available, most of the older medical officers felt that the estimates were highly optimistic. It was stated that maintenance of helicopters was so difficult that only a 20 per cent operational availability should be assumed and this during daylight only.

Major Demonstrations

Forward area evacuation. This area was presumed to have received serious initial gamma and neutron from several close tactical bursts. All organic transport including armoured personnel carriers ("Saracens") was utilized. It was emphasized that medical augmentation was necessary since the organic medical personnel had been exposed and could probably only function efficiently for about an hour. Although the Saracen is a large vehicle, its use as an emergency ambulance is limited; it can transport only one litter case.

Advanced Dressing Station (Medical Clearing Company)

- (1) Monitoring Department. Each litter patient was deposited in an alley between shoulder-high sandbag walls (to protect operator). Probe suspended by a string from tent roof was swung over patient. Instrument installed was a peacetime low-level gamma dose rate meter. Operator was a young dental officer, not prepared to say at what gamma level he would direct patient to decontamination or triage. (Note: triage area was after survey area.) Walking patients were directed to walk past a fixed probe placed at about waist level.
- (2) Decontamination. Those patients requiring decontamination were carried or directed to another tent where two methods were demonstrated; one was to vacuum the patient with an ordinary light vacuum cleaner whose exhaust was directed into a hole in the ground. There was no apparent venting arrangement, and it can be assumed that back pressure might be a problem. The other method was sponge washing. Gastro-intestinal cans for disposal of contaminated material were available; I saw no special arrangements to control run-off.
- (3) Triage. Patients were processed in lines, each passing by a recorder and examining physician. This appeared to be a potential bottleneck situation. It also required the examining *situo* physician to decide treatment and disposition immediately, with no opportunity to reappraise a patient.
 - (4) Treatment areas. These were conventional field medical facilities.
- (5) Galley and sanitary area. Field sanitation arrangements were similar to U.S. practice with perhaps more use of corrugated sheet metal. In several



places an improvised system for furnishing continuous hot water had been installed. This consisted of a shallow pit containing gasoline pressure stoves, walled and built up with brick and earth, with a double-layer corrugated metal roof. The layers were separated by about $\frac{1}{2}$ in. and the roof had a gentle pitch. Water from a reservoir was trickled into the high end, flowed over the hot metal, and was collected in a drum at the low end. The drum was provided with a stirrup-pump for pumping hot water over bed pans, etc. This has some obvious advantages over the batch method of making hot water commonly practised in the field by U.S. forces.

Westminster Pod. This was a full-scale mock-up of a mobile surgical unit utilizing the Westland Westminster helicopter. They are a five-bladed single-rotor craft of 21,600 lb. They stand on four bent legs, something like a lumber carrier, and straddle a "pod" 10.5 ft. \times 8.5 ft. \times 36 ft. The main fuselage can comfortably carry nine men. The demonstration consisted of a pod outfitted as a field surgery. Several features were very interesting:

- (1) The pod itself was used as a central supply and sterilizing area. Large let-down doors at each end assured ready off-loading of gear.
- (2) Rigid flooring for lean-to tents alongside the pod was built in sections which folded against the lateral bulkheads (externally). These provided a floor area $16 \text{ ft.} \times 32 \text{ ft.}$ on each side of the pod when unfolded and were fitted with sockets to receive aluminium stanchions for the light plastic tentage. These areas were the operating suites, etc., and communicated by side doors in the lateral bulkheads with the interior of the pod (central supply).
- (3) The total rigid floor space available as a self-contained surgical unit is 1,500 sq. ft., about the size of a tennis court. The helicopter has sufficient lift to carry the pod, the folding floors, the tentage, 3,000 pounds of medical equipment, and a nine-man medical team. When so loaded the craft has a range of 266 nautical miles at 100 knots.
- (4) Arrangements of the operating units are variable, of course. As set up at Ash Vale an anæsthesia room, operating room, and recovery room were set up on one side; on the other side the recovery room was deleted, resulting in a large, two-table, complete operating room.
- (5) This demonstration appeared to be the answer to a field surgeon's dream. It was roomy, had a dry floor, and the pod itself could easily house several critical post-operative cases in addition to serving as a central supply room.

The medical holding unit. This was a series of connected large field wards designed for management of serious radiation cases. Major problems were the disposal of vomitus and bowel excreta. I saw no particularly revolutionary ideas in handling this problem. Several styles of impervious sheets and blankets were demonstrated. It was planned that a minimum of medical officers would be attached to this ward, but that several dental officers and chaplains would be attached. Although there is considerable emotional objection to an "expectant" holding facility in the R.A.M.C., it was obvious that they realised such a facility

must be established, and this ward was such a facility. It was anticipated that almost all the patients in this ward would be fatalities, that insufficient personnel would be available to dig individual graves, and that the patients would have to be buried in a mass grave. In this same area an air-portable water-sterilizing and storage apparatus was demonstrated. The rubberized tank was of conventional design, but the method of obtaining chlorine for sterilization was interesting. Chlorine and nascent oxygen were obtained by the electrolysis of a brine solution. The apparatus was small, the power demand was approximately 25 amperes at 3 to 4 volts, and it was stated that this unit could provide 1,000 gallons of potable water an hour. This device obviously greatly simplified the logistic support required for a water point in that conventional bulky chlorine-releasing chemicals or bottled chlorine were unnecessary.

Comment on Demonstrations

The advanced dressing station components exhibited in this demonstration were in the main conventional, although there were several items of interest. Supporting stanchions and roof braces for the hospital tentage were of steel pipe, but all members were of the same length and completely interchangeable. The tents were flat-roofed, with a slight pitch, and could be readily joined to one another. The tentage was unlined, and so would probably be hot in a tropical area, but it looked as though it would be very simple to erect with unskilled labour.

In most of the hospital areas litters were used as beds for the patients, with no sawhorses or folding legs. One ward was set up with folding metal field hospital beds; these were of light steel design with springs and appeared to be a better bed than was available to F.M.F. field hospitals in WW II. The design, however, was not as elegant as some of the new U.S.A.F. aluminium field hospital beds. The litters were all of an old pattern with very heavy wood full-length poles, non-folding. I asked about British progress in litter design using new plastic materials and extruded aluminium poles and was told that none of the designs so far presented had proved sufficiently rugged for field use. The British are acutely aware of the fact that logistic problems would be greatly simplified if a light, practical litter could be devised.

The reception and triage areas were not designed, in my opinion, in a manner which could cope with a sudden influx of large numbers of serious patients. Like all field hospitals, though, I think this would be immediately modified in the event of an actual emergency. It was planned to fully utilize dental officers, chaplains, and other ancillary personnel to augment medical officers in the event of a mass casualty situation. I got the impression that the British Army relied on their female nurses for professional nursing care in the field and that their medical orderlies were not as highly trained as U.S. Navy corpsmen.

The air-transportable field surgery package utilizing the Westminster Pod appeared to be a very fine arrangement for a mobile surgical team and would answer many of the requirements for such teams under the U.S.M.C. vertical envelopment tactics.

Patients in this demonstration were very realistically made up. Moulages were not generally employed; the wounds were built up of plasticine, collodium, etc., and then hand-painted. The make-ups were superior to those shown in field exercises at Fort Sam Houston.

Seminar-Army Health in the Brigade Area

A proposal was made for a "Light Hygiene Detachment," consisting of one M.O., three corpsmen, two drivers, and two artificers (Sea Bees). Organic transport would be two jeeps, two jeep trailers, and two motor-cycles. The unit is to be an air-transportable environmental sanitation organization, whose mission would be to furnish emergency support for epidemic disease control. It would carry supplies of D.D.T., etc., and could be self supporting for some eight days. Duties would include mosquito and other vector control, checking water points, and waste disposal practices. They would be attached to the requesting unit for only limited periods. It was apparent that the need for such detachments was acute and the proposal was well received.

Some Experiences of a Surgeon while a P.O.W.

Dr. R. Harvey gave a highly entertaining account of experiences in the German P.O.W. system. The morale value of organized escape attempts, humour, and technical competence at distilling alcohol was emphasized.

Another Look at Chemical Warfare

Lieut.-Colonel H. W. Whitcher, R.A.M.C., presented a refresher lecture bringing the group up-to-date. It was pointed out that new agents were extremely toxic and that the percutaneous danger was high. The possibility of tactical employment of drugs affecting the psyche was mentioned. Although the talk was a somewhat sanitized affair, it was intended to remind doctors that chemical agents had not been forgotten by the weapons development agencies of the great powers.

Summing Up

Lieut.-General Sir Alexander Drummond, the Director-General, Army Medical Services, exhorted the audience to try the "school solutions" presented during this exercise in the war games of their own area commands. Several questionnaires were distributed for comment after local field trial.

Comments on Captain Stover's report by the Commandant, F.T.C. and H.Q. A.E.R., R.A.M.C.

It is always interesting and usually valuable to read a frank and unbiased critique. Captain Stover's report is especially valuable because it may stimulate some serious thought about combat development, or the lack of it, in the British Army Medical Services. Nevertheless, Captain Stover does appear in a few

instances to have concentrated on the details of some presentations, rather than on the ideas behind them. It may be of value to add a few explanatory comments.

It must be admitted at once that problems of security classification restricted the scope of some presentations and undoubtedly stultified discussion. For example, in describing the Field Demonstration (2) on the first day, Captain Stover doubts its value because size was not mentioned. It was in fact described as a low yield ground burst weapon. Further than this it was not possible to go.

Captain Stover makes some detailed comments on the discussion on Immediate Medical Care and Evacuation. Unfortunately discussion time had to be kept short in order that the very tight Exercise time-table could be adhered to. It was, moreover, stated by the officer making the presentation that fallout "rightly or wrongly" would be ignored at that stage, for the same reason as that now given. Early enemy exploitation was in fact described and the effect discussed at some length. The remark about roads and bridges being open is perfectly fair but of course there was only time for certain aspects of the problems to be considered. The Field Training Centre's proposals were, as it happened, based on exceptionally long ambulance car turn-round times, which were intended to account for delay in evacuation. So far as the civil population is concerned it was hoped that those in the Combat Zone would by then have been evacuated. The area described is not heavily populated.

The faults of current R.A.M.C. ambulances are of course well known and the author's comments are milder than those of many United Kingdom officers. Prototypes of new cars have been approved and troop trials are about to start.

Packaging of field medical kits is at present the subject of high priority study. The author's mildly surprised note that there are apparently no plans for decontamination of casualties in front of the A.D.S. is interesting. Our view has been that the probable numbers of casualties, and the certain urgency of evacuation, would preclude a procedure which in many cases can wait a few hours.

With regard to helicopters, they are capable of night flying when given certain aids, and estimated availability will, by 1965, be of the order of 60 per cent—not 20 per cent as stated. A modification of the Saracen is now being produced which will carry three stretchers.

Captain Stover, by implication, makes the interesting suggestion that the medical officer carrying out Triage should have the opportunity to re-appraise a patient. The British view has certainly been that when dealing with large numbers of casualties, some form of conveyor belt system will be essential and indeed that the essence of the Triage department is swift skilful sorting. Errors will of course be made but they should be corrected later by someone else.

THE REMNANTS OF AN ARMY

BY

J. P. J. ENTRACT, A.L.A.

Librarian, The London Hospital Medical College

"L'Angleterre n'a guere qu'un peintre militaire, c'est une femme."—FRENCH ART CRITIC.

In the regimental museum of The Somerset and Cornwall Light Infantry at Taunton hangs a painting which, eighty years ago, made its début at the Royal Academy. It depicts a man in a poshteen or short fur-lined jacket, mounted on a horse and clutching with both hands the pommel of his saddle. His head is flung back and to one side in an attitude of utter exhaustion, while the head of the poor beast droops in approaching death. In the background is a long line of sad-looking mountains, and nearer to hand the walls of a fortified town with a party of horsemen emerging through a gate to meet the rider. This well-known picture is entitled *The Remnants of an Army*.

In or about the year 1859, a much travelled English family were staying at the Villa de'Franchi at Sori, near Genoa. One day, Mr. Thompson, who was devoted to the private education of his two young daughters, touched on the history of the British in India and, amongst other things, mentioned the disastrous retreat of our forces through the Afghan defiles only seventeen years before. He described how the whole army was cut to pieces; how only one man, Dr. Brydon, managed to throw off his pursuers and, sorely wounded, reach safety behind the walls of Jellalabad. "Now, there's a good subject for you to paint when you are grown up!" he laughingly said to his younger daughter. For Elizabeth had already, in her ninth year, betrayed a talent for drawing and painting and, what must be rare amongst women, a particular aptitude for military figures and scenes of army life; so much so that, shortly afterwards, a surprised editor of the *Illustrated London News* was obliged to return with thanks to "Miss Elizabeth Thompson" a "design for a new uniform for rifle volunteers."

In 1866 she entered the South Kensington School of Art, where she became a favourite of the principal, Richard Burchett. Further study in Florence and Rome led in 1874 to *The Roll Call* (Crimean War), which made her reputation.² Her sister Alice was also, at this time, establishing herself—but as a poet and essayist. In 1877 both sisters married—Alice to Wilfrid Meynell and Elizabeth to Major Butler of the 69th Foot, who was later to become Lieut.-General Sir William Butler of Sudan fame.

The Remnants of an Army received high praise when it appeared at Burlington House. Besides the excellence of the workmanship, it struck a topical note in that the Second Afghan War was in progress—one soon to provide its own tragedy in the annihilation of General Burrows' force at Maiwand. Alfred

² Amongst other great paintings to come from her brush were Quatre Bras, Balaclava, Return from Inkermann and Steady, the Drums and Fifes!



¹ On permanent loan from The Tate Gallery.

Elmore, R.A., remarked: "It is impossible to look at that man's face unmoved," while another viewer approached the young artist with the words, "I had a wet eye when I saw your picture!"

But few could have known anything about the man who had attained such melancholy fame nearly forty years before and who later on survived another and equally desperate trial down in the Indian plains.

William Brydon was born in London on 9 October 1811. He was of Scots Border ancestry, one forebear having been provost of Dumfries, while another had led a troop of cavalry for the Young Pretender. After schooling under Dr. Rawes at Bromley, in Kent, he went on to study medicine at University College, London, and at the University of Edinburgh. Having decided to make his career in the East, he obtained the appointment of Assistant-Surgeon in the Bengal Army and proceeded to Calcutta in the year 1835.

It was a period of peace in India. Brydon was ordered up-country and for three years did duty with several different regiments in what were then the North-West Provinces. On three occasions he accompanied escorts when the Governor-General and the Commander-in-Chief paid courtesy visits to Ranjit Singh—the "Lion of the Punjab." In December 1838, at the outbreak of war with Afghanistan due to Russian machinations, he was posted to the 5th Native Infantry and marched with them in the "Army of the Indus" to the capture of Kandahar and Kabul. After the main part of the army had returned to India, Brydon remained behind with the occupation force in Kabul and was attached for a time to one of the regiments in the service of Shah Shuja, who had been restored to the throne in place of the usurper Dost Mohammed, now a "pensioner" in Calcutta. Then in 1841 occurred the murders of Sir Alexander Burnes and Sir William Macnaghten, the British envoys, and the rising of the Afghans, with whom Shah Shuja had never been popular.

The infirm general commanding the Anglo-Indian force completely lost his hold on the situation. A treaty was concluded with Akbar Khan, Dost Mohammed's son, providing for the evacuation of the force from the country, and in the depths of winter the column set out, complete with womenfolk and campfollowers. Both the general and the colonel of H.M. 44th—the only European regiment involved—were obliged to give themselves up as hostages en route. Akbar Khan, like the Nana Sahib many years later, was hand in glove with the executioners, but this time it was the tribesmen massed for miles on either side of the Khoord-Kabul Pass. The retreat became a massacre in the snow, with the climax on a hill at Gandamak when twelve survivors of the 44th charged into a horde of fanatical Ghilzais and perished to a man.

Brydon, however, with five other mounted officers, had managed to get farther ahead, despite hand-to-hand attacks by the hillmen. But at Fattehbad two of the party fell, and at a point within four miles of Jellalabad and safety three more were slain. The doctor owed his life to an odd chance for, besides



¹ Robert Booth Rawes, M.A. (c. 1785-1841), is locally identified as the original of Mr. Pickwick and in Bromley records a family of stage-coachmen of the name of Weller is frequently mentioned (vide "Bromley, Kent," by E. L. S. Horsburgh, 1929).

other wounds, he had received a murderous cut in the head from a knife. This blow, however, had been rendered comparatively harmless by a copy of *Blackwood's Magazine* which he had stuffed in his forage cap. He was thus the "last man" (the sobriquet by which he was later known) out of a force of 16,500, less a few prisoners, which had miserably perished over a period of seven days in that bitter January of 1842.

Having recovered from this fearful experience, Brydon continued on duty with Sale's Brigade, later to be known as the "Illustrious Garrison," and of which H.M. 13th (now The Somerset and Cornwall Light Infantry) formed a part. The defences of Jellalabad were, in the meantime, shattered by an earth-quake, but speedily repaired. Later, the garrison sallied out and defeated the forces of Akbar Khan sent against them. At last General Pollock and his avenging army forced the Khyber and relieved the defenders, and Brydon started back with them to the chastisement of Kabul.

The route was the same as that taken by the ill-fated column from the opposite direction, and all troops were kindled to a white heat of fury by the sights they met on the way. "The bodies," wrote Captain Backhouse, "lay in heaps of hundreds, our gun-wheels crushing the bones of our late comrades at every step for several miles; indeed, the whole march from Gandamak to Kabul may have been said to have been over the corpses of the massacred army." At last the army of retribution reached Kabul, where the following day they were joined by the army of Kandahar under General Nott.

Pollock and Nott, both skilful commanders, then engaged the Afghan forces in a series of battles and completely defeated them. The great bazaar in Kabul, where the mangled bodies of Burnes and Macnaghten had been displayed, was blown up; Charikar, where a Gurkha regiment had been annihilated, razed to the ground; and Istalif, in Kohistan, destroyed and its garrison with it. The few prisoners, British and Indian, who had been carried off to the country west of Kabul, effected their own release on the news of Afghan defeats and made their way to join up with the British forces. So ended this "wild expedition into a distant region of rocks and deserts, of sands and ice and snow."

For the next seven years, Brydon spent most of his service in the State of Bhopal, the Begum or Queen of which was later distinguished for her loyalty to Britain during the Mutiny. In 1849 he was promoted to Surgeon and posted to the 40th Native Infantry, one of the few Bengal regiments willing to serve overseas. In 1852, therefore, they formed part of the force sent to Burma and Brydon was present at the capture of Rangoon, Prome and other places.

In 1853 he went home on three years' furlough which coincided with the period of the Crimean War. Not long after he had returned to India, the Mutiny of the Bengal Army occurred and Brydon found himself in the thick of it, being stationed in Lucknow. While sitting at dinner one evening during the siege of the Residency, he was severely wounded in the lower part of the spine by a rifle bullet which passed through his loins from left to right and from which he was to suffer for the rest of his life. Yet he recovered sufficiently to hold various hospital charges in Sir Colin Campbell's army and ended by being made

"Surgeon Superintending" at Dinapore. He had been awarded medals for Jellalabad, Cabool, Burmah (Clasp for Pegu) and Lucknow, and in 1858 was made a Companion of the Bath. In the following year "the last man" returned home; it was, unknown to himself, about the same time that young Elizabeth Thompson received the germ of her idea for *The Remnants of an Army*.

Although a Lowland Scot born in London, Brydon's heart must have been in the Highlands, for he settled down at Westfield, near Cromarty. Here he freely gave his advice to all who sought it and continued his military connection by becoming honorary surgeon to the Highland Rifle Militia. For fourteen years he enjoyed his retirement until, in March 1873, he succumbed to the effects of the spine injury he had received at Lucknow. He was buried in the kirkyard at Rosemarkie, overlooking the Moray Firth, where his grave can still be seen.

For the confirmation of certain points, my thanks are due to the librarians of the India Office Library, London, the Borough of Bromley Public Libraries and the University of Edinburgh; and to the minister of Rosemarkie, Ross-shire.

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PATHOLOGY SECTION, ROYAL SOCIETY OF MEDICINE

THE Pathology Section, Royal Society of Medicine, held a meeting in the Pathology Department of the Royal Army Medical College on Tuesday, 16 February 1960. This very successful meeting was well attended and consisted of thirteen demonstrates.

strations given by regular and emergency reserve army medical officers.

Lieut.-Colonel D. W. Bell, R.A.M.C. (The Leishman Laboratory), showed several examples of granulomatous reactions in lymphatic glands including histoplasmosis in a young African adult male; visceral leishmaniasis presenting as a lymphadenopathy in five adult males shortly after arriving in Malta; and a chronic granulomatous reaction associated with Hodgkin's disease, initially showing a sarcoid-like appearance. In addition a case of disseminated non-necrotising vasculitis was shown which presented with a papular skin rash and thickening of the spermatic cord.

Lieut.-Colonel H. W. Whitcher, R.A.M.C. (The War Office), demonstrated a simple hand-operated bellows resuscitator. The face-piece is a complete fit in 100 per cent of subjects over the age of 12 years and the bellows has a safety valve to prevent over-inflation of the lungs. It is safe for the resuscitator to be used by an operator

without previous experience.

Lieut.-Colonel J. A. H. Brown, R.A.M.C., in collaboration with Mr. R. Westgarth (Harwell) gave a demonstration with charts on acute lethality in irradiated mice with particular reference to the effect of dose rate and fractionation. A larger dose is required the longer the duration of exposure, but changes in the dose rate and the number of fractions appear to be of no consequence. He also demonstrated the bacteriology of the irradiated mouse, showing how radiation interferes with the immunity mechanism as well as damaging the gastro-intestinal mucous membrane with resultant bacteræmia. The phenomenon of secondary disease in animals receiving whole-body lethal dose of radiation but kept alive by bone marrow transfusion from animals not of inbred stock was explained.

Captain D. C. Robson, R.A.M.C. (Military Hospital, Wheatley), demonstrated wet-film technique in neurosurgery. It was shown that the main application was in the diagnosis of tumours at operation with special reference to their degree of malignancy and influence on the course of the operation. Examples of astrocytoma, glioblastoma multiforme, oligodendroglioma, ependymoma, medulloblastoma and a fine example

of meningioma were given.

Major I. D. P. Wootton, R.A.M.C. (A.E.R.) (Post-Graduate Medical School), aroused much interest by showing a very ingenious piece of apparatus invented by himself for the estimation of serum calcium by automatic titration. The apparatus consists of a constant flow dispenser of ethylenediamine tetra-acetic acid (E.D.T.A.) which passes into the titration vessel mounted on a magnetic stirrer. Murexide is the indicator and when all the calcium has been titrated there is a sharp colour change which is reflected on the recorder connected to the photo-electric cell. The amount of E.D.T.A. used is calculated from the recordings and this is proportional to the calcium present. It was shown that the results were accurate and reproducible.

Brigadier L. R. S. MacFarlane (Royal Army Medical College) gave an interesting demonstration of some lesser-known parasites. These included the following: ovum of *Hymenolepis nana*: microfilariæ of *Onchocerca volvulus*: Onchocerciasis nodule with adult and microfilaria; sarcosporidiosis in human and sheep; *Plasmodium ovale* trophozoite; *Schistosoma mansoni* with paired worms in lung (an unusual site of conjugation); thorn in tissue simulating arthropod infestation; golden egg of a trematode causing pulmonary distomiasis, *Paragonimus westermanii*: culture of leptomonad form of kala azar on N.N.N. medium; *Toxoplasma gondii* from peritoneal exudate of experimental animal and *Schistosoma mansoni* in the spinal canal.

A series of three groups of demonstrations was exhibited by the commanding

The sections on cold injury are extremely interesting and useful, clearly stemming from the experience the Americans had in Korea. The section on radiation injuries is also of great interest although necessarily short in view of the fortunately small experience with this type of injury.

With regard to the actual treatment of wounds, the procedures suggested follow very closely on the whole, the practice which was evolved by British surgeons in the last two wars and which are recommended today in the Field Surgery Pocket Book. One feels, however, that a few of the points could have been described in more detail. Probably the greatest minor advance of the last war was the use of the Tobruk plaster. This is not described in any detail and the description would perhaps be ill-understood by someone who had never seen the thing either in practice or even in a diagram.

Many of these criticisms are of minor detail and others could be added, but on the whole, when one considers the difficulty that the authors must have had in combining many different ideas and points of view, one can only say that the finished work is most comprehensive and informative. It is not surprising that your reviewer would prefer the *Field Surgery Pocket Book* with its more homely and familiar English, but this work will undoubtedly be of great use.

J. H.

Principles of Medicine for Nurses. David Weitzman, M.D., M.R.C.P. London: Faber & Faber. 1959. Pp. 237. Illustrated. 21s.

This is a short, readable, and well-presented book written for nurses under training. In little over 200 pages there are sections on dermatology, pædiatrics, psychiatry, and even social medicine, as well as on general medicine and infectious diseases. Something is inevitably sacrificed for brevity and the book is hardly more than an introduction to the subjects it covers, but it is an introduction that is likely to be read and understood without difficulty. For this purpose it is recommended, and should prove useful and popular.

A. T. C.

NOTABLE NAMES IN MEDICINE AND SURGERY. Hamilton Bailey, F.R.C.S., and W. J. Bishop, F.L.A. 3rd Ed. London: H. K. Lewis & Co. Ltd. 1959. Pp. 216+xiv. Illustrated. 35s.

In the introduction to this book its purpose is clearly stated. It is not a history of medicine and surgery but a book where the medical man may find information on the names he meets in his day-to-day studies as a medical student or in his daily work as a medical practitioner; in this purpose it certainly succeeds. Moreover the book is made much more interesting by copious pictures. It is a volume well worth possessing and we look forward to the sister volume, *More Notable Names in Medicine and Surgery*, which according to the preface of the book is in preparation.

A. G. D. W.

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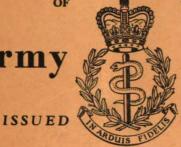
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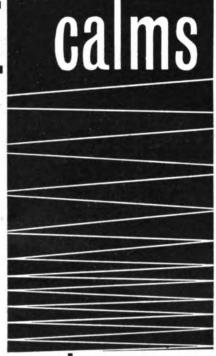
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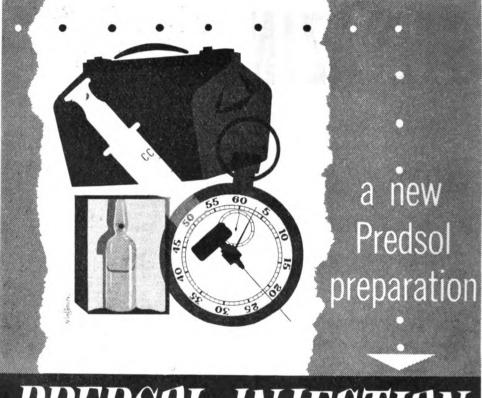
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ANÆMIA IN BRITISH SOLDIERS: A TEN-YEAR SURVEY, 1949-1958

BY

Lieut.-Colonel R. G. MACFARLANE, M.B.E., M.D., M.R.C.P. (Edin.)

Royal Army Medical Corps

IDIOPATHIC hypochromic anæmia in young men in this country is regarded as uncommon. Wintrobe & Beebe (1933), in an extensive bibliography, found only eighteen cases in males of all ages, and of these, five had developed anæmia following gastric operations. In Britton's (1936) classification of the anæmias in all age groups, there were only four men in whom the cause could not be decided.

Holt (1959) examined the hæmoglobin levels of 732 men attending the Army Eastern Command Physical Training School. These men were mainly recruits from Eastern Command depots in their first six weeks of training who were considered likely to benefit from an intensive physical development course; the majority were underweight, or overweight, and the remainder had failed at various stages of their recruit training. Holt found that a surprisingly high proportion of these men had mild anæmia and he estimated that 0.5 per cent of all recruits have a hæmoglobin level below 12.6 g. per 100 ml. This figure agrees with that found in the survey of normal Army recruits done by Stewart, Yeates & Barnfather (1957).

In the present survey, medical records at the Statistical Branch of the Army Medical Directorate were examined. These records consisted of summaries of the case notes of service men and women who had been admitted to hospital because of anæmia in the ten years 1949 to 1958. The survey is therefore an extension of Holt's work. An attempt is made to assess the incidence of anæmia severe enough to cause soldiers to be admitted to hospital, to classify these anæmias, and to ascertain the causes of iron deficiency anæmia in Army patients.

There were 562 patients, 93 were females and 469 males. It is principally

the males who will be discussed. For statistical purposes the International Classification of Diseases 1955 is used in the Army, and in this work it was thought expedient to use this form of classification. The relevant section is as follows:

```
290
     Pernicious and other hyperchromic anæmias
             Pernicious Anæmia
             Addison's
     290.2
             Other hyperchromic anæmias
             Achrestic
             Hyperchromic
             Megalocytic
291
   Iron Deficiency Anæmias (hypochromic)
             achlorhydric
             hypochromic
                                        of prematurity
             iron deficiency
                                        secondary to hæmorrhage
             microcytic
                                        Witts
292 Other anæmias of unspecified type
     292.0
             Congenital hæmolytic anæmia
     292.1
             Acute hæmolytic anæmia (Lederer)
     292.2
             Other hæmolytic anæmias
             Acquired
               acholuric jaundice
               hæmolytic anæmia
      292.4 Aplastic anæmia
293 Anæmia of unspecified type
             Anæmia not otherwise specified
                     normocytic
                     secondary (not after hæmorrhage)
                     simple
```

Table 1 shows the distribution of the anæmias in the survey.

Table 1. Distributions of the Anæmias.

				Males	Females 4 8 1
290	Pernicious			6	1
290.2	Hyperchromic			21	2
291	Iron deficiency (I.D.,	A.)		340	71
292	Congenital hæmolytic			32	1
292.2	Acquired hæmolytic	•	• • •	4	
292.4	Aplastic	•••		15	_
293	Unspecified			51	18
					_
	Totals			469	93

Iron Deficiency Anæmia (I.D.A.).

The factors associated with this group are shown in Table 2. In 182 no cause could be found. If it is assumed that poor iron intake or absorption was responsible for I.D.A. in these men, it would be relevant to add the 68 with poor physical development or poor diet, and the four with a poor social background, to the idiopathic group of 182. Thus the total of "idiopathic" I.D.A. becomes 254. This figure is 74.7 per cent of all the males with I.D.A. This contrasts with the series classified by Britton (1936) where the cause could not be decided in only four men out of 183 unselected patients in all age groups.

Achlorhydria was noted in 61 men of this group. This is significant only in excluding peptic ulceration in these men and possibly in reflecting the extent of the iron deficiency. The response to iron, either orally or parenterally, or both, was excellent in all but a few men in the I.D.A. group.

Table 2. Factors associated with I.D.A. in Males.

Poor physical de			poor	diet			68
Alimentary tract	t bleed	ling	•••	•••	•••	• • •	55
Malaria	•••	•••	• • •	•••	• • •	• • •	7
Respiratory trac	t bleed	ling or i	nfect	ion			5
Service in tropic	cal clin	nate					5
Poor social back	groun	d					4
Following partia							4
Blood loss-trau							3
Diarrhœa							1
Steatorrhœa							1
Reticulosis	•••						1
Hypopituitarism							1
Purpura		•••	•••	•••	•••	•••	ī
Following infect			•••	•••	•••	•••	•
	live ne	pauns	• • •	•••	•••	• • •	•
Radiographer	• • •	• • •	• • •	•••	• • •	• • •	1
Idiopathic	•••	•••	•••	•••	•••	•••	182
Total	•••		•••	•••	•••	•••	340

Table 3 shows the age groups in the males with I.D.A. and Fig. 1 shows the percentage of idiopathic cases in each age group. Table 4 shows how I.D.A. in males was related to length of service in the Army. It is seen that 61.2 per cent of the idiopathic group were found to be anæmic within three months of joining the Army and that 75 per cent were found before they had completed six months service.

Pernicious and other hyperchromic anæmias.

In this group of thirty cases, three were females; fourteen had megaloblastic or macrocytic anæmia associated with service in a tropical climate, or sprue or malaria; nine were not related to tropical service, and seven were diagnosed as pernicious anæmia. So far as can be made out from the medical documents, the accuracy of the diagnosis of pernicious anæmia was not checked by radioactive vitamin B_{12} absorption studies, except in two cases who came under my care. These two had severe anæmia with megaloblastic sternal marrow and histamine-fast achlorhydria. They were males aged 38 and 20 years with no family history of pernicious anæmia. Unfortunately, the results of radio-active vitamin B_{12} studies were equivocal but no evidence of steatorrhæa, overt or occult, was found. They both responded well to treatment with vitamin B_{12} .

Anæmias of unspecified type.

There were fifty-one males and eighteen females in this group. In twenty-three, the records were insufficiently detailed to be of value; I think it is of interest to note that more than half of these records were made before 1951 i.e. before the Inter-services F. Med. series of documents came into use.

In this group of unspecified anæmias there were eight men under the age of twenty-one who were noted to be undernourished; all had less than three months service and in none was bleeding noted. There is no doubt that if most of the unspecified anæmias could have been more clearly defined they would have fallen into the I.D.A. group. This is borne out by noting that bleeding from

the alimentary tract and elsewhere accounted for ten cases, malaria for four and service in a tropical climate was relevant in two. For these reasons I think it best to ignore this group of unspecified anæmias in the discussion which follows.

Symptoms.

The symptoms noted were those common to all anæmias. Excessive dyspnæa on effort was noted frequently; this is hardly surprising in soldiers who are inevitably called upon to make strenuous physical effort. This was the commonest symptom in those men found to be anæmic before they had completed three months service.

Annual rates.

The annual rates per 1,000 for each type of anæmia were calculated and are shown in Table 5. From this it is seen that except for other hæmolytic anæmias (292.2) and aplastic anæmia (292.4) the female rates are much higher than the males. This preponderance is most clearly seen in the unspecified and the I.D.A. groups where the rates are seventeen times and nearly eleven times more, respectively, in females than in males. This is not unexpected, except that one would have thought that the female rates would have been even higher. The annual rates per 1,000 by age and by length of service were estimated and are shown at Tables 3 and 4.

Table 3. Age groups I.D.A. males

(a) All I.D.A.

(b) Idiopathic group.

	under 20		21-25		25–30		over 30	
Age	(a)	(b)	(a)	(b)	(a)	(b)	(a)	(b)
Number	270	225	41	26	7	1	22	1
Annual rates by age groups	0.133	0.111	0.043	0.027	0.027	0.004	0.041	0.002

Table 4. Length of Service—Males

(a) All I.D.A.

(b) Idiopathic group.

Length of Service	Nur	mbers	Annual rates by length of Service		
	(a)	(b)	(a)	(b)	
0–3 months	183 (53.9%)	155 (61.2%)	0.421	0.356	
4-6 months	41 (12.1%)	37 (14.2%)	0.126	0.113	
Over 6 months	115 (34%)	63 (24.5%)	0.038	0.021	

Diagnosis	Code	Males	Females
Pernicious Anæmia	290.0	0.002	0.014
Other hyperchromic anæmias	290.2	0.006	0.028
I.D.A	291	0.090	0.982
Congenital hæmolytic anæmias	292.0	0.008	0.014
Other hæmolytic anæmias	292.2	0.001	
Aplastic anæmia	292.4	0.004	
Anæmia unspecified	293	0.013	0.249

Table 5. Annual rates per 1000.

DISCUSSION

Anæmia in young adult males in this country has been regarded as uncommon. The present study confirms this but probably points to a higher incidence than previously estimated. The ætiology of the anæmia in the 254 men in whom no cause could be found may be related to Holt's (1959) study of men of poor physique. On this basis, poor nutrition may be a factor in anæmia in young men. That this may be so is perhaps surprising in Britain but may reflect, not so much on poverty, as on poorly chosen diet or ignorance of basic food values, or food faddishness in certain families or individuals. This is reinforced by the fact that so many of the men in this study were found to be anæmic within three months of joining the Army and that 68 (20 per cent) were found to be of poor physique.

Leonard (1954) estimated the hæmoglobin of 4,221 Royal Air Force recruits and found 50 with a level of 12 g. per 100 ml. or less. All these men made a good response to intravenous iron. Most of them were of social class IV or V.

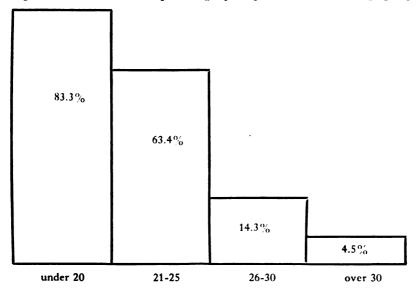


Figure 1.—I.D.A. Males: percentage of idiopathic cases in each age group.

This again may point to poor dietary intake, due to poverty, or poor choice, or ignorance about food as causative factors of anæmia in young men.

When the age groups of men with I.D.A. are studied (Table 3) it is seen that the majority, 79.4 per cent, are under 20 years of age. Furthermore the percentage of idiopathic cases in each age group (Fig. 1) is high in the under-20 and in the 21 to 25 age groups. This might be due simply to the fact that there are more soldiers in these age groups than in the older groups. To see if this is so the Statistical Department of the War Office estimated the rates by age groups. The information to do this was not readily available and strict accuracy could not be guaranteed; however, estimations based on the numbers of recruits were produced. The rates by age groups are shown in Table 3 and the rates by length of service in Table 4.

These clearly show an age trend and a length of service trend in both I.D.A. as a whole and in the idiopathic group. The effects of age and service are of course intermingled, as generally the older soldiers have the longer service. Why should young soldiers be more prone to I.D.A. than their elders?

In the idiopathic group, where poor nutrition is a possible factor, it seems likely that many recruits were anæmic on enlistment because of inadequate diet in civilian life, and that after six months in the Army the deficiencies have been made good. The British Army ration is rich in all the basic food elements, minerals and vitamins. The longer a soldier eats this excellent ration the more he is likely to overcome any adverse effects of poor diet which he may have had in civilian life. This could explain the diminishing trend of I.D.A. with increasing service and age. The exertions which an anæmic young man experiences in his recruit training undoubtedly brings to notice symptoms which he did not have in the less strenuous conditions of civilian life.

Another view of the cause of anæmia in recruits was put forward by Shorthouse & King (1951). They quoted Cantarow (1947) who showed that 23 per cent of the minimal iron intake is required for the manufacture of muscle hæmoglobin and for use in muscle and other parenchymal cells; this iron is not available for blood hæmoglobin formation. Shorthouse & King (1951) suggested that the enhanced muscular development which recruits often show might create an abnormal demand for iron which, if not met by increased intake, might be obtained at the expense of blood hæmoglobin. This is an attractive theory but since nearly all recruits increase in weight and muscular development during their first few months of service, those few who are found to be anæmic must be assumed to begin their service with poor reserves of iron.

It seems likely that poor nutrition before enlistment is important as a cause of anæmia in recruits. Since recruits have passed a medical examination before entry, how many more young men, either rejected on medical grounds or not called up at all, are anæmic? Should therefore I.D.A. in young men, hitherto rarely considered, receive more attention and more thought from the medical profession? This is a question which can only be answered when the extent of the problem is revealed by wider study of young adult and adolescent males as a whole.

SUMMARY

The medical records of British Army patients admitted to hospital with anæmia between 1949 and 1958 were studied. The causes of the anæmia are set out and classified. Anæmia in young men is uncommon but not so uncommon as previously published figures have suggested. Poor diet may be a cause of anæmia in young men in this country.

I should like to thank Mr. S. Rosenbaum, M.A., Principal Scientific Officer, Army Medical Statistics Department, The War Office, for making available the medical records and for providing the statistical work.

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MACLEOD'S SYNDROME

A REPORT OF THREE NEW CASES AND A REVIEW OF THE LITERATURE

BY

Captain G. C. RIVETT

Royal Army Medical Corps

From the Connaught Hospital, Bramshott (Army Chest Centre)

This paper presents three new cases of a syndrome first described in detail by Macleod as "Abnormal Transradiancy of One Lung" (Macleod, 1954). Additional cases have been described by Dornhorst, Heaf & Semple (1957), Belcher et al. (1959), Bates (1959), Margolin et al. (1959), Darke, Crispin & Snowden (1960) and Fouché, Spears & Ogilvie (1960). The condition may be asymptomatic but most patients present with one of the common complaints of chest disease, notably cough, recurrent chest infections or shortness of breath. On examination the breath sounds are reduced in intensity on the side affected and there may be a localised or a generalised wheeze. The problem of diagnosis is first raised by the chest radiograph for there is striking transradiancy of one lung or lobe due at least in part to a small pulmonary arterial tree.

CASE REPORTS

Case 1

A 30-year-old platoon sergeant had bilateral pneumonia as an infant, and had been told that he was asthmatic until he was seven years old. He remained well until he was 27 years old when he became a heavy smoker, increasing from ten to fifty cigarettes a day. From this time he noticed increasing shortness of breath on training exercises. When seen at the age of 30 years he had become short of breath marching at a normal pace although he could continue indefinitely and he did not become cyanosed.

Breath sounds were faint on the right side. On both sides of the chest the expiratory phase was prolonged and there were expiratory and inspiratory rhonchi.

The PA chest radiograph showed increased transradiancy and small vessels on the right, the right diaphragmatic leaf being low and failing to move upwards on expiration. There was no mediastinal swing on respiration.

Tomograms showed very small arterial trunks on the right, but on the left the arteries were large and obviously wider than normal well out into the lung field. The right bronchogram showed poor peripheral filling most marked in the middle and lower lobes, but was otherwise normal.

Bronchospirometry was carried out at the London Chest Hospital by Dr. Smart and Dr. Capel. Both the vital capacity and the oxygen uptake were reduced, the reduction in the oxygen uptake on the side affected being proportionately more than the reduction in vital capacity. This is characteristic of the condition.

Obstructive airway disease was also present. The Forced Expiratory Volume (FEV_{0-1}) was less than 1,000 ml. when the patient was first seen, but it increased to 1,900 ml. after treatment with choline theophyllinate ("Choledyl") and an isoprenaline spray. In short, this sergeant had mild asthma and a virtually functionless right lung.

Case 2

A 25-year-old corporal was admitted in 1956 complaining of cough, left-sided pleural pain and shortness of breath. A similar illness had occurred in 1954 but there was no history of chest trouble before this. He had smoked ten cigarettes a day since 1951.

Breath sounds were faint on the right but examination was otherwise normal. On bronchoscopy an increase in bronchial secretions was seen.

The chest radiograph showed increased transradiancy on the right, the vessels being small. The movement of the right diaphragm was slightly restricted. On expiration the right leaf of the diaphragm remained at a lower level than the left and the heart moved to the left.

Tomograms confirmed that the vessels to the right lung were small, but there was great enlargement of the main, lobar and segmental arteries on the left. There was a calcified gland at the left hilum. The left bronchogram was normal.



Fig. 1.—Right bronchogram of Case 2. There is poor peripheral filling, and bronchiolar pools are present in the lower lobe.

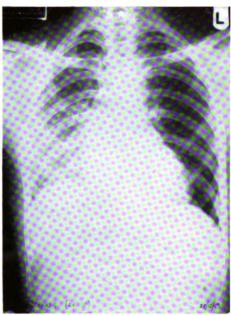


Fig. 2.—Forced expiration radiograph of Case 3, showing "trapping" on the left. Increased transradiancy is present on this side.



Fig. 3.—9 cm. tomogram of Case 3, showing normal right pulmonary arteries and small left pulmonary arteries.



Fig. 4.—Left bronchogram of Case 3 showing dilatation and occlusions of the lingular bronchi (left oblique view).

MACLEOD'S SYNDROME

but on the affected side there was poor peripheral filling and some small bronchiolar dilatations in the right lower lobe (Fig. 1).

The patient was discharged from the Army and has been followed up at the Sheffield Chest Clinic under the care of Dr. H. Midgley Turner. He has had repeated chest infections and a chronic cough producing purulent sputum. He is becoming increasingly short of breath and has to walk slowly even on the flat. In December, 1958, he developed a chest infection with "bronchospasm" necessitating treatment with corticosteroids. Respiratory function tests in January, 1959, showed reduction in vital capacity, FEV₀₋₁, and maximum breathing capacity. Since leaving the Army he has been unable to hold down a steady job and he is at present doing office work.

Case 3

A National Service man working as a storeman at the Connaught Hospital had a routine radiograph which showed increased transradiancy of his left lung (Fig. 2). At the age of nine months he had "bronchitis and pneumonia" but since then he has remained well. He is now 20 years of age and he plays football for the hospital although he finishes last on cross-country runs. For the last two years he has smoked five cigarettes a day.

He has a high-arched palate and he is colour-blind (Ishihara). The left side of the chest is smaller than the right, moves poorly, and the breath sounds are reduced on this side. "Trapping", the failure of normal emptying during forced expiration, occurs on the left, the left diaphragm failing to move up and the heart moving to the right. The PA chest radiograph shows the main and lobar arteries on the left to be small, and this is confirmed by AP tomography (Fig. 3). The right bronchogram is normal but on the left side bronchial dilatation and occlusions are seen in the lingula with poor peripheral filling in the basal segments (Fig. 4).

Alterations in the lung density were measured as the transradiancy changed during respiration by an image intensifier and photo-cell, and it was found that the change in transradiancy in all regions was smaller on the left than on the right. This probably represents reduction in ventilation on the abnormal side. Radio-isotope studies showed that ventilation and gas exchange were moderately reduced in the left lower zone (Laws & Steiner, 1960; Hugh-Jones, 1960).

A summary of the clinical and radiological findings in the three cases appears in Table 1.

DISCUSSION

The cause of this interesting condition remains uncertain as few pathological reports are available. A series of specimens are to be reported by Dr. Lynne Reid who kindly discussed her material with me before publication. The main changes affect the terminal bronchioles. There is an increase in the wall musculature and in the fibrous tissue surrounding them. Occasionally complete blockage can be demonstrated, alveoli distal to such blockages being adequately ventilated by collateral routes. Considerable disruption of the walls of respiratory bronchioles

Table 1. Summary of three new cases of Macleod's Syndrome reported in this article.

	Case 1	Case 2	Case 3		
Age at onset of symp- toms.	27 years	25 years	Now 20 years and asymptomatic.		
Side affected	Right.	Right.	Left.		
Presenting symptoms	Increasing shortness of breath and wheezing.	Cough, left-sided pleural pain and shortness of breath.	None.		
Radiological findings.	Increased trans- radiancy on the right. Normal bronchogram.	Increased trans- radiancy on the right. Bronchiolar pools in the right lower lobe.	Increased trans- radiancy on the left. Poor peripheral fill- ing and bronchiec- tasis of the lingula.		
	Tomograms show the right pulmonary artery to be small and the left to be large.	Tomograms show the right pulmonary artery to be small and the left large.	Tomograms show small left pulmonary artery.		
Respiratory function	FEV 1,450 ml.	2,250 ml.	2,550 ml.		
tests.	FVC 2,400 ml. FER 60%	3,060 ml. 69°0	3,750 ml. 68%		
Regional function.	Bronchospirometery Right left VC 1,200 ml. 1,700 ml. (41° ₀) (59° ₀) O ₁ 21° ₀ 79%		Oxygen—15 Reduced ventilation and absorption in left lower zone.		
Childhood illness	Bilateral pneumonia at 6 months and asthma till 7 years.		Bronchitis and pneumonia at 9 months.		
.Function and Category.	Short of breath on severe effort. P3.	Out of breath on the flat. P8.	Fails PE test but asymptomatic. P3.		

Definitions.

Forced Expiratory Volume: The volume in millilitres expelled during the first second of a forced expiration, following a deep inspiration.

Forced Vital Capacity: The total volume expelled during such an expiration.

Forced Expiratory Ratio: The ratio of the above, the FEV being expressed as a percentage of the FVC. It is normally above 70-75 per cent.

and alveoli occurs. The characteristic air-trapping is probably due to the increased resistance of collateral channels of ventilation.

Inflammatory changes may be present but appear to be of long standing. Many patients have had severe respiratory illness in childhood (Belcher et al., 1959), and the material available is consistent with the view that such infections produce damage at the bronchiolar level, the bronchi themselves remaining in many cases virtually normal. The poor peripheral filling seen bronchographically probably indicates bronchiolar obstruction which may be responsible for the reduced lung ventilation; increased flow resistance at the level of the smaller air passages is suggested by recent studies of air flow and pressure relationships (Darke et al., 1960).

Arterial flow is known to diminish with a reduction in regional ventilation. This is probably the explanation of the small arterial size in this condition.

While congenital hypoplasia of the pulmonary artery is difficult to exclude as a cause of Macleod's Syndrome, such a lesion does not explain the presence of airway obstruction and bronchial deformity, especially as a normal bronchogram may be obtained in congenital absence of a pulmonary artery (Bates, 1959; Macleod, 1960) Normal pulmonary vascular markings and the absence

of emphysema have been noted in one case during infancy, although the patient's right lung now presents a characteristic appearance (Lees, 1960).

The natural history of the syndrome is better documented. The presenting symptoms of patients in whom an entire lung was involved are summarised from the literature in Table 2. Cases in which the abnormality was restricted to a single lobe have been excluded although this is not uncommon (Belcher et al., 1959). The ages given are those at which symptoms first appeared, when this can be determined from the histories.

Of the 29 cases, 6 were asymptomatic and were discovered on routine radiography. The average age of these 6 cases was 29 years. Twenty-three had symptoms, 17 having a cough or repeated chest infections, 14 shortness of breath, and at least 5 wheezing. Their average age was 27 years.

The time of presentation appears to be determined by the appearance of a

Table 2. Presenting symptoms of 29 cases of Macleod's Syndrome in which an entire lung was affected. The ages given, calculated from the histories, are those at which symptoms first appeared.

Series			Age at onset	Nil	Cough and Infections	Wheeze	Dyspnæa
Swyer & James (1953)	•••		Infancy		+		
Macleod (1954)	•••	•••	38 22 Below 32		+++		+
			24		,		+
			20		+		+
			30 32			+	+
			18	.4.	+		+
			18	+			
Dornhorst et al. (1957)			11		+		+
			35 ?		. + +		+
Belcher et al. (1959)		•••	Below 49				+
			Below 55		+		
			41 52	→ →			
Elder et al. (1958)			26 years				
Margolin et al. (1959)			19		+	+	+
			3 32		+ →	+	+
Bates (1959)		•••	26	-+	····		
Dyson et al. (1960)			37				+
Darke et al. (1960)	•••		34		+		
			17 18		- - 		-+-
Present series			27			+	
	•••	•••	25		4.	-7-	4
			20	- ‡ -			
Total number of cases affected		29	6	17	5	14	

complication rather than by the condition itself. Commonly presentation is precipitated by a respiratory infection, or the reduction of an already low respiratory reserve by a new factor such as excessive smoking.

The youth of the patients is surprising especially as most were reported by physicians seeing a wider age group than does the Army Chest Centre. Only a few cases have been followed. Case 2 has deteriorated, but no change was found in any of five of Macleod's original nine patients who were followed up for a minimum of four years (Dornhorst et al., 1957; Macleod, 1960).

Radiological and laboratory findings

In most cases the diagnosis is established radiographically. The plain film suggests unilateral reduction in vessel size and this can be confirmed by tomography or angiography. A reduction in pulmonary artery size occurs in several types of gross lung disease especially when lung ventilation is reduced. In Macleod's Syndrome the reduction is particularly striking and a reciprocal enlargement may be present on the opposite side (Belcher et al., 1959). This was seen in cases 1 and 2.

Bronchograms are usually abnormal on the affected side. Because of the obstruction of the terminal bronchioles and the reduced ventilation the peripheral branches do not fill. Case 2 shows bronchiolitis, small pools the size of pin-heads being seen in the periphery of the right lower lobe. Case 3 has bronchiectasis of the lingula. Previous reports describe such appearances.

The failure of normal emptying during forced expiration has already been mentioned, and the reduced change in transradiancy on the affected side was recorded by an image intensifier and photo-cell in case 3 (Laws & Steiner, 1960).

Assessment of respiratory function is handicapped by the difficulty of separating the contributions of a healthy and a diseased lung. Measurement of the overall efficiency of ventilation shows reduction of the maximum breathing capacity and FEV₀₋₁. In the cases described the FEV varied between 60 and 69 per cent, the reduction being due to trapping. Studies on anæsthetised patients show that there is marked resistance to both air entry and outflow (Darke et al., 1960). It is therefore likely that the trapping is not due to valve mechanisms but to obstruction of the smaller air passages. This is in accord with the bronchographic and histological evidence.

Several methods of assessing regional lung function are available. Bronchospirometry shows great reduction in oxygen uptake and a smaller reduction of tidal volume and vital capacity on the affected side (Belcher et al. 1959). This investigation was carried out under local anæsthesia in Case 1, the vital capacity being 41 per cent and the oxygen uptake 21 per cent of the total.

An isotopic method of studying ventilation has recently been introduced (Dyson et al., 1960). The patient takes a breath of air containing radio-active oxygen or carbon dioxide, simultaneous measurements of radio-activity being made over both lungs. The quantity of isotope entering the lungs, the rate of absorption during breath holding, and the speed of elimination when breathing starts again are measured. Several cases of Macleod's Syndrome have been



studied by this method. In Case 3 reduced ventilation and absorption of radiooxygen and carbon dioxide were found in the lower zone, but in the upper zone there appeared to be a compensatory increase in ventilation (Hugh-Jones, 1960).

Gas analysis and flow measurements have also been carried out at bronchoscopy using a continuously recording mass-spectrometer, and this method confirms the findings of other techniques.

Cardiac catheterisation has been carried out on only one case. A normal resting pulmonary arterial pressure was found, but on exercise or after occlusion of small branches passing to the normal side there was a marked rise in pulmonary arterial pressure (Elder et al., 1958). It is therefore likely that the pulmonary vascular resistance of the affected lung is increased. The delayed filling seen on angiograms is consistent with this view.

Diagnosis and management

Unilateral increase in transradiancy is not in itself a diagnosis and may be seen in a number of conditions. The differential diagnosis includes faults in centring the film and asymmetry of the chest wall and musculature. "Congenital lobar emphysema of infants" and the obstructive emphysema of partial bronchial obstruction produce similar radiographic appearances although the affected lung is usually increased and not reduced in size. A collapsed bronchiectatic segment may produce increased transradiancy in the surrounding lung, and finally congenital absence of a pulmonary artery may occur although this is rare (Madoff et al., 1952).

While a definite diagnosis should be made, the patient's comfort must be considered. The following diagnostic criteria are therefore suggested:

- (1) Increased transradiancy in a region shown by tomography to be supplied by a small pulmonary artery.
- (2) Evidence of trapping on a forced expiration radiograph.
- (3) A bronchogram showing patency of the main bronchi without there being a collapsed segment or lobe.

Studies of regional lung function though invaluable in doubtful cases are not required routinely.

No curative treatment for this condition exists. Nevertheless the patients should be advised to stop smoking for there is a strong clinical impression that smoking aggravates the shortness of breath of many forms of chest disease. The nature of the condition should be explained to the patient, and the general practitioner should be told of the functional disability, as apparently trivial chest infections may become serious in patients with only one functioning lung. Patients are advised to report any new symptom immediately, and to select light rather than heavy work.

SUMMARY

Three new cases of Macleod's Syndrome are described. The whole of the right lung was affected in two cases and the whole of the left lung in one.

The cause, natural history and investigation of the syndrome are discussed, and simple diagnostic criteria are suggested.

It is proposed that all patients should be told in simple terms of the nature of their disease.

My thanks are due to Lieut.-Colonel J. Mackay-Dick, O.B.E., for his encouragement) Dr. Lynne Reid for her information on the pathology of the condition, Dr. George Simon for the radiographic reports, Dr. P. Hugh-Jones, Dr. J. Smart and Dr. L. Capel for their help in the investigation and discussion of these patients, and to Dr. H. Midgley Turner for the follow-up of Case 2.

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CHORIOCARCINOMA OF THE UTERUS

BY

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CHORIOCARCINOMA is a rare condition, the incidence of which has been variously estimated as between one per cent (Novak, 1948) to sixteen per cent (Essen-Moller, 1912, quoted by Munro Kerr & Chassar Moir, 1949) of various series of hydatidiform mole follow-up investigations. But it must not be forgotten that the condition also occurs after abortion or normal pregnancy, indeed probably more commonly.

Way (1951) quoting Brews (1939) mentioned that of 24 cases at the London Hospital from 1885 to 1937 only 8 followed vesicular mole whilst 11 followed abortion or normal labour at term; the ætiology of the remainder apparently not being recorded. Teacher (1903) in a series of 188 cases gave the distribution as: hydatidiform mole 73, abortion 59, pregnancy at term 49, extrauterine pregnancy 7.

Given an incidence of hydatidiform mole of between 1 in 1,500 and 1 in 2,500 (Brews, 1939 and Novak & Seah, 1954) it would appear that the incidence of choriocarcinoma in relation to pregnancy would be in the region of 1 in 8,235. In certain geographical areas, however, where the incidence of hydatidiform mole is much higher than average, a proportionally increased incidence of choriocarcinoma will be found; for instance Gordon King (1956) gives a figure of 1 in 3,708 for Hong Kong.

Clinical features

Usually, the warning symptom will be continuation or recurrence of abnormal uterine bleeding after evacuation of a vesicular mole; or abnormal bleeding following pregnancy or completed abortion, although this symptom may not appear for some months after the incident.

Sometimes metastatic deposit will be found in vulva or vagina, and often luteal cysts of the ovaries will be present. Enlargement of the uterus is common and there may be nodular growths on the peritoneal surface of the uterus, or within the wall, appreciable on bimanual examination.

However, clinical symptoms and signs may be entirely absent until secondary deposits of metastases make their presence known by localising symptoms, commonly in the lungs and/or the central nervous system. Chorionic gonadotrophic hormone output is always increased and may reach remarkable heights (see case 1), but the level does not appear to be related to the degree of malignancy.

Diagnosis

The diagnosis should not be missed where a hydatidiform mole is the ætiological factor and when routine observation, repeated curettage, and chorionic gonadotrophin estimations are done. Examination under anæsthetic and curettage should be carried out at the first warning symptom and chorionic gonadotrophin estimations done at least fortnightly until negative. Thereafter they should be carried out fortnightly for three months, monthly for the next three months, then every two months for the next six, and three monthly in the second year, provided, of course, that the results have remained negative throughout that time. Thereafter the patient is instructed to report at once any irregular bleeding per vaginam, hæmoptysis, or muscle weakness. An annual chest X-ray is advised.

Should the patient become pregnant again the progress must be watched carefully for any aberration from the normal, and serial morning specimen urines should be taken for observation of any sudden increase in the pregnancy test dilutions. It may be that the risk of choriocarcinoma developing after an apparently normal pregnancy and puerperium following upon a hydatidiform mole is increased, but I know of no definite evidence to support this, and such cases that have been reported may well have arisen as a result of the normal

pregnancy rather than from the mole; nevertheless the patient should again be carefully followed up for at least two years. When the condition arises "out of the blue" after normal pregnancy or abortion, however, it is likely that the first clinical symptoms apparent to the patient and causing her to seek medical advice will be those of a late stage of the disease, with a very poor prognosis.

The differential diagnosis between residual mole (or syncytial endometritis), invasive mole (chorio-adenoma destruens), and choriocarcinoma, is clinically very difficult (Gordon King, 1956); even where a histological report on curetted material is immediately available to the clinician the result may not reveal the whole pathological picture.

The rate of metastatic spread may be very quick, possibly as short as within two weeks of the evacuation of a hydatidiform mole, or it may be delayed for any time up to two years, or, in rare cases, even longer intervals have been reported following normal pregnancy and abortion.

Treatment

Radical surgery of the primary tumour, and local areas of spread, i.e. total hysterectomy and bilateral salpingo-oophorectomy, should be carried out as soon as the condition is diagnosed; for, as was re-emphasised by Way (1951), regression of the secondary growth may occur after such measures. Embolic trophoblast is known to occur both in normal pregnancy and with hydatidiform mole, occasionally giving rise to hæmoptysis, and being demonstrable by chest X-ray (Novak & Seah, 1954), and to have regressed on follow-up.

Surgery should be followed by deep X-ray therapy where evidence of secondary spread already exists or becomes evident at a later date. Certainly early radical surgery gives, at present, the only fair chance of survival.

Recently published work (Buckle, 1959) has suggested the use of folic acid antagonists, such as methotrexate, and 6-mercaptopurine, in the treatment of metastasising choriocarcinoma; and of such procedures as immunisation of the patient to her husband's cells, and pituitary ablation with radioactive isotopes; but insufficient work has been done in the United Kingdom for their value to be assessed as yet.

Case 1. Clinical notes

This patient was a Maltese primipara, aged 25. She had had a normal domiciliary delivery of a healthy full-time child in December, 1954. The lochia had persisted for one month following delivery, but there had been no further vaginal loss.

On 24 February, 1955, the patient noticed a lack of power in the right upper limb and found that she was tending to drop kitchen utensils, etc., during her ordinary housework. On 1 March, 1955, she had a Jacksonian type fit affecting the right arm, and was referred by her medical officer to the neurological department of St. Luke's Hospital, Malta, for investigation. Two further fits occurred after admission, with progressive paralysis of the right side.

During routine neurological examination, the cerebro-spinal fluid was reported to be normal (Aschheim-Zondek Test not carried out); X-ray of the

skull was normal; X-ray of the chest showed "cannon ball" opacities. With a presumptive diagnosis of choriocarcinoma, the patient, being a soldier's wife, was then transferred to my care at the David Bruce Military Hospital, Malta.

On admission on 16 March, 1955, she had a right-sided flaccid hemiplegia, with a right 7th cranial nerve play. The left optic disc showed early papillædema. The uterus was bulky, approximately the size of a six week cyesis, the ovaries were enlarged, and there was a secondary deposit three-quarters of an inch (20 mm.) in diameter, grape-bluish in colour, in the lower third of the anterior vaginal wall. X-ray of the skull showed rounded opacities in both cerebral hemispheres and X-ray of the lungs showed massive "cannon ball" infiltration of both lungs, leaving apparently little normal lung tissue.

The morning specimen of urine was despatched by air to Edinburgh, and the report (received after operation had been carried out) stated that it contained between 2,700,000 and 3,000,000 international units of chorionic gonadotrophin: urgent request for further specimens could not be met.

Although lumbar puncture had been carried out as part of the preliminary investigation, unfortunately the material was not available for Aschheim-Zondek test. The patient's condition on 17 March was rapidly deteriorating, and after consultation with Professor J. Craig, F.R.C.S., total hysterectomy was carried out at 1630 hours that day.

Operation 17 March, 1955. Total hysterectomy with bilateral salpingooophorectomy was carried out. Both ovaries were enlarged and contained numerous lutein cysts, many of them hæmorrhagic. Blood loss during operation was negligible.

Progress. Post-operatively the patient's general condition continued to deteriorate; her fluid intake was maintained by intravenous drip of one pint (568 ml.) of normal saline to three (1,700 ml.) of five per cent dextrose per twenty-four hours, with occasional sips of water by mouth; the urinary output was very poor, amounting to a state of oliguria. During the day after operation the pulse rate rose slowly but steadily to 140 per minute, and during the second night she became comatose, and died at 0900 hours on 19 March, 1955, 40 hours after operation.

The prognosis in this case had been regarded as practically hopeless, but in view of the reports in the literature of regression of metastases after removal of the primary growth it was felt right to give the patient the remote chance.

Pathology. The following organs were examined macroscopically:

Uterus. The dimensions were 8 cm. $\times 5.5$ cm. $\times 4$ cm. The upper two-thirds of the uterine cavity was filled with yellowish white friable tumour tissue, approximately 3 cm. in diameter, which was flecked with hæmorrhage. The lower border of the growth tended to be rather circumscribed and macroscopically invasion of the myometrium was not obvious.

Ovaries. The dimensions of the ovaries were: Right ovary 5 cm. \times 2.5 cm. \times 2 cm. Left ovary 2 cm. \times 3 cm. \times 3 cm. Both ovaries were seen to be enlarged with a lobulated surface. On section, numerous thin-walled cysts of variable size were situated mainly at the periphery. The walls of the cysts were smooth

and while some contained clear pale-yellow fluid many were filled with dark brown altered blood.

Liver. In the right lobe of the liver necrotic and hæmorrhagic tumour tissue 3 cm. in diameter was seen. General fixation of the liver tissue was poor.

Lungs. There was widespread replacement of lung tissue by tumour in all lobes of the lungs giving them a nodular appearance. On section the metastases tended to be round and well circumscribed, varying in size from 3 to 0.5 cm. in diameter.

Brain. Left cerebral hemisphere. A rather sharply defined and very hæmorrhagic secondary tumour 1.5 cm. in diameter was situated in the occipital lobe. The brain tissue surrounding the growth was discoloured by altered blood and a few petechial hæmorrhages were present in the vicinity. A further hæmorrhagic deposit 1.5 cm. in diameter was situated just beneath the motor area in the upper portion of the hemisphere.

Right cerebral hemisphere. A hæmorrhagic tumour tissue 1 cm. in diameter was present in the occipital lobe.

Cerebellum and brain stem were macroscopically normal.

Spleen and kidneys were macroscopically normal.

The following organs were examined microscopically:

Uterus. Sections showed the tumour tissue to consist of masses of trophoblastic cells in which syncytial and Langhans elements were present. No chorionic villi were seen. Much of the tumour was necrotic, hæmorrhagic and infiltrated with polymorphonuclear leucocytes (see Fig 1). In the sections prepared there was necrosis of the uterine muscle but extensive invasion of the myometrium by tumour tissue was not a feature.

Brain and Lung. Showed metastatic tumour with histological features closely simulating the primary growth (see Fig. 2). In some sections of the brain compound granular corpuscles were present in large numbers at the periphery of the growth.

Ovaries. Sections showed numerous cysts many of which were filled with blood-The cells lining these cysts were variable; in some instances they were granulosa cells, in others lutein cells of thecal origin. A few collections of cells which morphologically resembled granulosa lutein rather than theca lutein were also present.

Diagnosis. Choriocarcinoma.

Case 2. Clinical notes

This patient was an English multigravida, aged 27 years. The previous obstetric history was of a normal pregnancy and normal delivery of a healthy female infant in January, 1957. In the present pregnancy, her second, the last menstrual period had begun on 9 August, 1958, and apart from emesis, had progressed normally until the sixth week when she had slight vaginal bleeding for one day; this was followed by a black to brown vaginal discharge and increasing emesis. She was admitted to my care at the British Military Hospital,

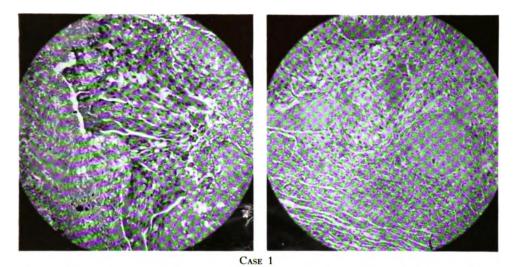


Fig. 1.—*Uterus*. Invasion of myometrium by choriocarcinoma. The muscle is necrotic and infiltrated by polymorphonuclear leucocytes.

Fig. 2.—Lung. Metastatic tumour tissue resembling primary growth.

(×60 magnification)

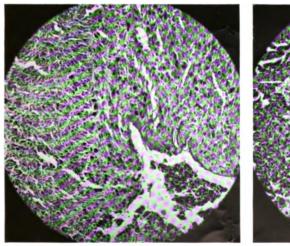
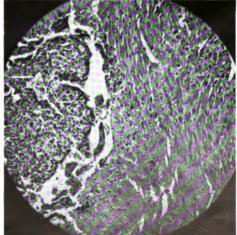


Fig. 3.—Infiltration of myometrium by pleomorphic and hyperchromatic syncytio-trophoblastic cells.



CASE 2

Fig. 4.—Cyto-trophoblastic and syncytiotrophoblastic components of the choriocarcinoma are distinguishable. There is necrosis of muscle fibres and infiltration by inflammatory cells.

CHORIOCARCINOMA OF THE UTERUS

Rinteln (British Army of the Rhine—Western Germany), on 17 October, 1958, as a case of threatened abortion with hyperemesis gravidarum.

On examination, a tense uterine mass was palpable per abdomen at approximately the level of an 18 weeks' cyesis, the level of the fundus was about double that expected from the dates. She was complaining of continuous low abdominal pain.

A morning urine specimen for pregnancy diagnosis test, sent to the Group Pathology Laboratory, City General Hospital, Sheffield, on 18 October, 1958, was positive at 1/10 dilution, but this report was not available until over a week later. In anticipation of such delay and because of the patient's poor general condition a specimen was also sent to the Bakteriologisch-serologische Institut, Hameln, which reported "Hogben positive and quantitative Gonadotrophins in all dilutions positive (0.03 to 0.005 Prolan)". On 20 October the patient's condition was deteriorating rapidly. Hæmoglobin had fallen from 65 per cent (9.7 g.) to 55 per cent (8.2 g.) and the pulse rate had risen from 110 to 140 per minute. Erythrocyte sedimentation rate was 37 mm. in 1 hour. Lung fields were clear radiographically. The cervical os was closed and therefore surgical treatment was elected and proceeded with without further delay.

Operation (hysterotomy). 30 October, 1958. On opening the abdomen the uterus was seen to be dark, very tense, and so ballooned in shape that access to the isthmus was not readily obtainable. An interesting feature that I had not previously experienced was a very marked lowering of the uterine temperature compared with the body temperature; it literally felt cold.

Because of the shape of the uterus, a "classical" hysterotomy was performed, and the mole delivered spontaneously after intravenous injection of 0.5 mg. ergometrine; the cervical canal was dilated from above to Hegar dilator size 14 to permit good drainage, and the uterine wound was closed with interrupted mattress catgut sutures and a continuous superficial layer. Oozing from the uterine wound was rather troublesome but eventually responded to local heat and further 0.25 mg. ergometrine intravenously. The ovaries were not enlarged, but small cysts were noted in the left. Blood transfusion was commenced during the operation and continued post-operatively; in all, four pints (2,272 ml.) were given.

Progress. The post-operative course was stormy, due to bilateral basal collapse of the lungs; however she eventually made good progress. Post-operative hæmoglobin was 80 per cent (11.5 g.) and there was no vaginal loss by the time she was discharged from hospital on 4 November, 1958.

Pathology. Macroscopically the specimen consisted of a large mass of tissue composed of blood clot and masses of small cysts. The cysts measured up to 0.7 cm. in diameter.

Microscopically the sections showed placental tissue. The chorionic villi were generally dilated, often considerably; their stroma in most cases had been replaced by a granular amorphous material. There was a well-developed Langhans layer and sometimes a fair amount of syncytial trophoblast surrounding or in clumps on the surface of the villi, with some pieces invading the decidua.

The decidua was sometimes hyaline, sometimes infected. There was no evidence of malignancy.

Diagnosis. Hydatidiform mole.

The Sheffield Laboratory Hogben test reports during the crucial weeks were as follows:

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18 October, 1958—Positive 1/10 dilution
1st post-operative week 23 October, 1958—Negative
3rd ,, ,, 4 November, 1958—Negative
5th ,, ,, 19 November, 1958—Negative
7th ,, ,, 5 December, 1958—Positive 1/10 dilution.
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Subsequent progress. The last report was received on 17 December, 1958, and the patient was readmitted the next day with the suspected diagnosis of choriocarcinoma. There were no symptoms of pregnancy, other than amenorrhoa, for there had been no bleeding per vaginam. The uterus was normal in size, shape and position, softer than normal in consistency, but Hegar's sign was not present; the patient denied the possibility of pregnancy. Clinically there was no indication of disease. Chest and skull X-rays were negative. Cerebro-spinal fluid sent for Aschheim-Zondek test to the Jessop Hospital Laboratories, Sheffield, was negative. The Hameln Laboratories reported Hogben test positive at less than 33,000 Aschheim-Zondek units, and, on the receipt of this confirmatory report on 22 December, 1958, operative treatment was proceeded with.

Operation. 22 December, 1958. Total hysterectomy with bilateral salpingooophorectomy was carried out. The ovaries were slightly enlarged as compared with the previous operation and both contained numerous small cysts. The uterus was normal in size, and externally the hysterotomy wound appeared sound, but on opening at the end of the operation a small soft tumour was seen to be situated in the upper part of the cavity and appeared to be infiltrating the uterine wall in the region of the upper end of the wound. Blood loss during the operation was negligible.

Early post-operative progress was again worrying, the pulse rate rising to 160 per minute in the second night; there was occasional vomiting and some distension of the abdomen. However, she again settled down well, and was discharged from hospital on 10 January, 1959.

The Hogben test on 24 December, 1958, was positive at 1/10 dilution, was negative on 5 January, 1959, and has remained so to date (November, 1959) and the patient remains well, with no evidence of metastasis.

Pathology. Macroscopically the specimen consisted of an uterus and appendages. The uterus measured 9.5 cm. from fundus to cervix, 6 cm. across the fundus and 3.5 cm. across the cervix and was up to 4 cm. in thickness. The endometrium was scanty, in the area of the fundus there were brownish, irregular areas in the myometrium, soft in consistency. One tube measured 4.5 cm. and up to 0.7 cm. in thickness, the associated ovary was adherent to the external surface of the uterus and measured 2.4 cm. \times 2.2 cm. \times 2 cm. It contained a hæmorrhagic cyst, 1.4 cm. in diameter and a number of small follicular cysts. The other tube measured 4.5 cm. \times 0.7 cm. and had an associated parovarian cyst 0.9 cm. in

diameter. The associated ovary measured 2.6 cm. $\times 2.0$ cm. $\times 1.7$ cm. and contained numerous small cysts and an area of luteal tissue.

Microscopically, the sections of the uterus showed, in the lower part of the endometrial cavity, a few normal-appearing endometrial tubules lying in a stroma infiltrated by inflammatory cells and containing small pieces of hyalinised tissue and a few large trophoblastic cells. In the region of the fundus there was widespread infiltration of the myometrium, which showed degenerative changes and small hæmorrhages, and invasion by masses of cells and single cells. These were sometimes small, with round vesicular nuclei and vacuolated cytoplasm, reminiscent of seminomatous tissue, others were large with abundant cytoplasm and large, often bizarre, often hyperchromatic, nuclei, some cells being multinucleated (see Fig. 3). In one section there were clumps of syncytial tissue with necrotic centres and here three chorionic villi were seen, with, in certain areas, an ill-defined Langhans layer, a fibrous stroma and a considerable surrounding trophoblastic layer again showing the two types of cells (see Fig. 4). The cervix showed small cysts, the tubes showed mild salpingitis and there was a small parovarian cyst on one side; the ovaries showed multiple follicular cysts and a corpus luteum.

Comment. While the invaded muscle showed some degeneration and hæmorrhage, this was not as extensive as is generally described in cases of choriocarcinoma. Many of the invading cells, too, were single and gave the picture seen in syncytial myometritis. A few chorionic villi were seen. On the other hand the invasion of myometrium was widespread and there appeared to be two types of cells—masses like seminomatous cells, interpreted as being from the Langhans layer, and numerous syncytial trophoblastic elements. While it is stressed (Novak & Novak, 1958) that the presence of villi, almost irrespective of the amount of trophoblastic overgrowth, makes one lean away from the diagnosis of choriocarcinorna, an occasional villus can persist.

Diagnosis: Choriocarcinoma.

DISCUSSION

In reviewing the two cases after the events, the following points are considered to be of special interest. The absence of uterine hæmorrhage in both cases; i.e. the complete lack of early symptoms which might draw attention directly of patient and/or medical attendant to the focus, is unusual and not in conformity with the classical description of the symptomatology of this disease.

The very considerable infiltration of the lung tissue in Case 1, without localising symptoms, and no apparent signs until the terminal stage, apart from the radiological picture, was very surprising.

In Case 2, a diagnosis of invasive mole had not been excluded preoperatively, but the return to a positive pregnancy urine test (at a lower level than with the previous mole), after an interval of six weeks during which there had been three negative results, together with the absence of other symptoms and signs of pregnancy, led to my decision that hysterectomy was the correct procedure in the circumstances, and this view was supported by the change in the ovaries

noted at operation. Curettage was considered inadvisable in view of the recent hysterotomy, and the delay involved was unacceptable in view of my previous experience of the speed of metastatic spread in choriocarcinoma.

The reasonably quick change from positive to negative Hogben between 24 December, 1958, and 5 January, 1959, following the total hysterectomy on 22 December, 1958, allowed me to advise that X-ray therapy was not immediately necessary, but the patient is under frequent surveillance with a view to such treatment should any secondary involvement appear.

One point which has been of some concern to me is my predilection in the past for hysterotomy as the treatment for hydatidiform mole. It was a matter to which perhaps I had not given due consideration, that is that hysterotomy per se may predispose to invasive mole, even choriocarcinoma developing in the uterine wound. However, I feel that in this particular case, hysterotomy was the treatment of choice, because the size of the growth, the somewhat unusual tenseness of the uterus, the unopened cervix, and the "toxæmic" condition to the patient, demanded radical treatment.

În my personal experience as an obstetrician in service life I see, perhaps, a more average cross-section of the fertile (and unfertile) women than is experienced by the specialist in civilian practice, upon whom must come a preponderance of the abnormal. Nevertheless in an approximate total of 5,000 pregnancies and abortions in the last 10 years, I have dealt with seven hydatidiform moles, four of which I have delivered by hysterotomy, one by evacuation of the uterus per vaginam and two have delivered spontaneously. In addition I have had two histological reports of hydatidiform mole from abortions which were not obviously so to the naked eye. That is an incidence of 1 in 555, more frequent, in other words, than has generally been reported from the more specialised units. I believe that my four cases which I delivered by hysterotomy (two by classical incision and two by low transverse incision) were more safely dealt with than by the vaginal route; only one (Case 2) required blood transfusion, and that by reason of her pre-operative hæmoglobinæmia; but the one whom I felt could reasonably be evacuated from below, bled profusely during and after delivery and also required blood transfusion.

Coppleson (1958) in an analysis of 64 cases of hydatidiform mole in Sydney found that 50 per cent were spontaneously delivered, and that the majority of the remainder were safely and effectively dealt with by medical induction followed by dilatation and curettage as necessary. Munro Kerr & Chassar Moir (1949) however, acknowledge the dangers and difficulties of vaginal delivery, and stress the speed and ease of hysterotomy in selected cases.

On the whole I do not think the uterine wound in hysterotomy predisposes to the subsequent development of choriocarcinoma, certainly no more than would the slight wounds that may be caused by even gentle curettage.

SUMMARY

- 1. The incidence of choriocarcinoma of the uterus is examined.
- 2. Two cases of choriocarcinoma occurring in a series of approximately 5,000 pregnancies are described.



- 3. Attention is drawn to the quandary of diagnosis, the fact that no early symptom or sign may appear.
- 4. The need for early and radical surgery is stressed, especially under those conditions in which speedy histological opinion may not be available.

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ACUTE POST-TRAUMATIC RENAL INSUFFICIENCY

BY

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THE role played by the artificial kidney in the management of acute renal failure is now accorded its due importance. However, it still remains only a part of the basic therapeutic régime. Throughout the British Isles there exist five main centres dealing with civilian cases of renal insufficiency. Recent experience by the American Medical Corps in Korea would suggest that a renal centre should be readily available in time of war for treating cases of traumatic renal insufficiency occurring in battle casualties.

The fatality rate for cases of acute post-traumatic renal insufficiency* in the Second World War was 90 per cent and a similar figure was recorded in Korea in those cases not admitted direct to the Renal Insufficiency Centre. The fatality rate of those cases treated at the Renal Insufficiency Centre was

[•] Henceforth referred to as A.P.T.R.I.

reduced to 53 per cent. The latter percentage is not ideal as in civilian practice the figure approximates more nearly to 25 to 30 per cent. Future warfare is likely to incorporate nuclear as well as conventional weapons and consequently the number of cases of A.P.T.R.I. requiring extracorporeal hæmodialysis will be considerably increased.

In Korea one oliguric patient occurred in each 200 surviving hospital casualties, though variations of this figure may be expected in different military situations, depending upon the availability of blood and the rapidity with which casualties can be evacuated and obtain medical attention.

The factors responsible for initiating acute renal failure were found to be:

- (i) Prolonged period of hypotension.
- (ii) Infusion of a large amount of relatively old blood (in Korea blood had to be transported all the way from the United States).
- (iii) Severity of the initiating wound, especially if there had been direct damage to the kidney.

Military casualties suffering from A.P.T.R.I. differ from their civilian counterparts in that the development of clinical uræmia and potassium intoxication is accelerated. However, in the warfare envisaged in future the civilian may, clinically, more closely simulate the military casualty.

The diagnostic criterion used in the forward hospitals in Korea as a basis for referring patients to the Renal Insufficiency Centre was oliguria (less than 500 ml. of urine in 24 hours) without hypotension on the second or third post-wound day. The presence of uncomplicated dehydration was excluded by a specific gravity of the urine of less than 1030. In view of the more rapidly developing uræmia and potassium intoxication, evacuation was made as soon as the diagnosis was confirmed.

Evacuation

As formerly, the acutely wounded patient would be carried by stretcher from the point of wounding to the aid post supporting the regiment. Evacuation to the advanced surgical centre would be by helicopter during the day, and by ambulance at night. The less severely injured would travel by stretcher-jeep or ambulance through the C.C.S. to the forward surgical hospital. In Korea the average time of evacuation for 50 per cent of the patients reaching a forward hospital was within three hours of wounding. The Renal Insufficiency Centre was established at a large evacuation hospital about 70 miles from the front so as to be within helicopter range of the forward hospitals. The average time between being wounded and arriving at the centre was 3.2 days.

Organisation of a Renal Insufficiency Centre

The Renal Insufficiency Centre should be attached to a large evacuation hospital so that specialist services are available to deal with any complication other than renal suppression. Adequate biochemical and electrolyte estimations can be made by the pathology laboratories of the hospital, and a technician

can be loaned during the time of the dialysis to estimate the clotting times of the extracorporeal blood and evaluate repeated hæmatocrit readings. A medical officer and technician would be responsible for the artificial kidney machine and another medical officer—preferably a senior medical specialist—would supervise the patient during the course of the hæmodialysis.

Type of artificial kidney machine

The dialyser unit should be relatively small, yet safe and functionally reliable. It must not be injurious to elements of the blood and, if necessary, must act as an ultrafiltrator of plasma. Requirements for volume of blood, water and electrical power must be minimal (Teschan & Baxter, 1958).

The different types of artificial kidneys available at the present time are the rotating type of machine originally constructed during the Second World War by Kolff (Kolff, 1947) and later modified by Merrill (1955) and his co-workers at the Peter-Bent Brigham Hospital, and by Parsons (Parsons & McCracken, 1959) in Leeds. Alwall (1947) and Skeggs, Leonards & Heisler (1949) have devised similar types of dialysers but differing in principle and construction from the Kolff apparatus in that they are capable of ultrafiltration as well as dialysis. More recently, Kolff (Kolff, Watschinger & Vertes, 1956) has developed a disposable twin coil canister artificial kidney. Three models of dialysers are under test by the American Army: they are the Kolff coil, the MacNeill Mark Xb 5 and the MacNeill Mark X1b-26 (Teschan & Baxter, 1958).

Procedure of dialysis

The dialysis which should be carried out in a special room is continued for six hours, but the whole procedure including cannulation and decannulation takes about nine hours. The sites preferred for cannulation are the radial or brachial artery for the supply to the blood pump and the median cubital, cephalic or saphenous vein for the return from the dialyser. If it is decided not to use an artery for the blood supply to the machine, venous blood may be obtained by passing a long polythene cannula up the saphenous and through the femoral vein to the inferior vena cava. In this case it is convenient to use a double lumen cannula extracting blood from low down in the inferior vena cava and returning it to the vena cava higher up. Heparinisation is maintained at a level sufficient to prolong the blood coagulation time to 30 to 50 minutes during the major portion of the procedure. The initial dose of heparin includes 25 to 50 mg. added to the donor blood, 10 mg, in the isotonic saline used to fill the cannulas and 25 to 50 mg. administered direct to the patient. In those cases of uræmia where there is a bleeding tendency, titratable amounts of protamine may be infused via the venous cannula in an endeavour to maintain the clotting time of the corporeal blood at a more normal value.

Indications for hamodialysis

The selection of the optimal time for the institution of hæmodialysis in the oliguric patient is an important and difficult problem for the clinician. Recent

work (Edwards et al., 1958) would suggest that the distorted electrolyte and plasma constituents occurring in acute renal failure do not impair the recovery of damaged kidneys, and there is no necessity to carry out early or repeated dialyses. However, the use of the artificial kidney should not be delayed until the patient's condition is poor enough to make dialysis a hazard.

Clinical symptoms which would indicate hæmodialysis are persistent nausea, vomiting and early mental changes. Biochemically, dialysis is indicated if the alkali reserve falls below 13 mEq/1. or the plasma potassium level exceeds 7 mEq/1. and the electrocardiograph is suggestive or definitive of hyperkalæmia. The level of the blood urea in important, not because urea has any toxic properties, but because the level acts as an indicator of the breakdown of protein, and should the urea exceed 300 mg./100 ml. then dialysis may be indicated.

Complications during the hæmodialysis

Hypotensive reactions sufficiently severe to warrant the corrective use of blood transfusions or solutions of pressor amines or both may occur from time to time; the mechanism underlying these reactions is obscure. Minimal decrease or increase in blood pressure may occur in an otherwise uneventful dialysis and these can be adequately controlled by altering the position of the patient, the decrease in blood pressure by elevating the foot of the bed and the increase by raising the head of the bed.

Biochemical results

For a successful hæmodialysis the aim is to produce the following biochemical adjustments in the plasma composition of the patient:

- (i) Reduction of blood urea and creatinine to at least 50 per cent of the pre-dialysis values.
- (ii) Reduction of plasma potassium concentrations where hyperkalæmia exists to values within the normal range and preferably to approximately 3.5 to 4.0 mEq/1.
- (iii) Stabilisation of plasma bicarbonate levels at approximately 20 mEq/1. where the initial values are appreciably lower than this.
- (iv) Adjustment of sodium, chloride and calcium to low normal values.

Clinical results

During the course of hæmodialysis any arrhythmias due to potassium intoxication are usually corrected within 30 minutes and acidotic breathing within 3 to 4 hours. Uræmic twitching and mental confusion may be aggravated during the course of dialysis and this may be sufficient to require controlling by deep sedation. Clinical improvement is most noticeable 24 to 48 hours following the dialysis and is usually maintained for several days even in the presence of severe oliguria, dialysis being repeated in about 7 to 10 days if required.



Basic therapeutic régime

Fluid intake and output is accurately charted, and during the phase of anuria or oliguria oral fluids should be restricted to about 600 ml. per day. The patient is encouraged to take a diet such as sugared rice, buttered toast, sponge cake, etc., and intravenous or intragastric therapy is avoided. Protein anabolic drugs such as nilivar are useful in preventing the destruction of the patient's own protein. Daily estimations of the serum electrolytes should be carried out and if hyperkalæmia is suspected an electrocardiogram will confirm any cardiac irregularity. There are several methods available to control potassium intoxication, the most effective being the use of ion-exchange resin enemas. Extracorporeal hæmodialysis is performed when the clinician thinks it necessary.

SUMMARY

With the establishment of the artificial kidney as an essential part of the management of acute renal failure, it would seem that the Army Medical Services should have available a renal insufficiency unit which could be rapidly mobilised in time of war.

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AN UNUSUAL CASE OF ACTINOMYCOSIS

BY

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It seems wrong in this type of case to state bluntly the diagnosis at the beginning of the paper. A story which is complicated should unfold itself gradually, and the features and progress of this case are therefore described as they occurred.

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Case Report

The patient was a man of 47 who had been sent back from Germany, and was admitted to The Queen Alexandra Military Hospital in February, 1959. Four months previously he began to complain of vague abdominal symptoms with epigastric discomfort after meals. It soon became obvious to his wife that he was losing weight steadily. His normal weight was 11½ stone, but on admission he was 8 stone 10 pounds.

In December, 1958, he had twelve small hæmoptyses, but he never had any other chest symptoms. In the same month he began to note some nocturnal frequency. In January, 1959, he started sweating at night, and while an in-patient he had a low-grade fever.

On admission, his chief complaint was persistent pain in his left flank. This had been present for three weeks and had gradually become more severe. He felt weak and feverish. His appetite was poor and he vomited readily. On direct questioning there was nothing relevant in his past history, except that at the end of December, 1958, he had a loose tooth removed.

On examination, he was a pale, anxious, chronically ill man, with marked signs of wasting. His teeth were in a poor state. He had no chest signs, clubbing or lymphadenopathy. He had marked tenderness and local guarding in the left flank, and extension of the left hip increased the pain on this side. The liver was enlarged three finger breadths on percussion. There were no other abnormal signs.

Investigations on admission

Hæmoglobin 74 per cent. Total white cell count 14,100 per cu. mm.; polymorphs 68 per cent. E.S.R. 32 mm. per hour (corrected Wintrobe). M.S.U. Numerous pus cells, a few red cells and a trace of protein. Culture negative. Liver function tests were all normal except for a raised alkali phosphatase of 50 King-Armstrong units. Sputum negative for *Mycobacterium tuberculosis* on culture and guinea pig inoculation.

Mantoux test positive to 1/1,000 dilution (100 units).

Radiological findings

P.A. chest radiograph showed a right mid-zone lesion, which on the lateral film was in the anterior segment of the right upper lobe. Examination of an old P.A. film taken in December, 1956, showed a much smaller opacity in the same region. An intravenous pyelogram done previously at the B.M.H. Hostert showed impaired function of the left kidney, and retrograde pyelogram demonstrated an abnormal pattern. Barium meal and enema were also both normal.

No growth was seen at bronchoscopy, and a "blind" mucosal biopsy was normal.

Progress

Initially it was felt that the lung opacity was a bronchial carcinoma, and that his left flank tenderness was possibly due to a perinephric abscess. At explora-



tion, the left kidney was adherent locally and necrotic tissue was bursting through its capsule. The macroscopic appearance at the time suggested a hypernephroma. It was therefore with great surprise and relief that the diagnosis of actinomycosis was later made by examining material from the drainage wound. Subsequent anærobic culture revealed a growth with the typical morphology and biochemical reactions of *Actinomyces bovis*.

He responded dramatically to an initial dose of one mega unit of soluble penicillin b.d. and in a matter of a few days he began to gain strength. However, the pulmonary opacity persisted and the dosage of penicillin was therefore increased to three mega units twice a day.

Because it was felt that his teeth could well have been the source of his fungal infection, a dental clearance was performed. All nine teeth were cultured, but with negative results.

Early in May, 1959, he had a sudden attack of intense abdominal pain and rigidity. Rupture of an actinomycotic liver abscess was feared, but at operation all that was found was some bile-stained fluid in the peritoneal cavity, and eight gall stones were removed. Cholecystectomy was later performed.

He had a total of 1,000 mega units of soluble penicillin over a seven months period, and he was then transferred to the Brompton Hospital. In September, 1959, an anterior segmental resection of the upper lobe of the right lung was performed, and the persistent pulmonary lesion was found to be a caseating tuberculous mass. In addition he had scattered nodules throughout the specimen, and these on further serial section proved to be micro-abscesses due to actinomycosis.

He was therefore placed on all three anti-tuberculosis drugs—streptomycin, P.A.S. and I.N.A.H. He returned to work in February, 1960, and in May his weight had increased to 11 stone 6 pounds.

DISCUSSION

Renal actinomycosis is extremely rare. Thus, Kimball & Haining (1933) reported only five cases of actinomycosis with renal involvement in 7,000 autopsies performed in the preceding 15 years at the Los Angeles County General Hospital. In Foulerton's (1913) earlier series, taken from seven London teaching hospitals from 1902 to 1912, there was only one case with renal actinomycosis.

The literature reveals a few cases of so-called primary renal actinomycosis (Cohen, 1943; Kindall, 1934a, b; Moore & Tapper, 1935; Polk, 1942, and Abbott, 1924). The earliest and most notable was described by Israel in 1901, and this patient was alive and well eleven years after nephrectomy. However, the systemic nature of the disease has been stressed by many authors (Cumming & Nelson, 1929; Zachary Cope, 1952; Hunt & Mayo, 1930a, b) and this case also emphasises this point. For though the left kidney was chiefly affected, careful histological examination also revealed actinomycotic micro-abscesses in the lung tissue removed.

The literature reveals a number of clinical features which are often seen in renal actinomycosis. Firstly the general symptoms such as weakness, weight

loss and febrile sweats with anæmia and leucocytosis precede the local signs. The important local sign is loin and flank tenderness and Bevan (1923) describes "wooden-like infiltration" of the lateral abdominal wall as a later feature. Occasionally a tender mass may be felt which suggests a perinephric abscess. Unlike tuberculosis of the renal tract, frequency of micturition is unusual. However, examination of the urine will often show pus cells, a few red cells and a trace of protein. Pinner (1922) and Beregoff (1929) were able to make a firm diagnosis by finding mycelia of *Actinomyces bovis* in the urine. However, this is extremely unusual.

Intravenous and retrograde pyelography is frequently abnormal on the affected side, but this only confirms the presence of renal pathology, and may wrongly suggest a renal tumour.

The appearance of the kidney at operation may suggest a hypernephroma (Cumming & Nelson, 1929). Frank pus is unusual, but marked adherence of the kidney to local structures is common and this often renders nephrectomy impossible. Post-operative fistula formation is a strongly suggestive feature, and many weeks may elapse before the true diagnosis is made by examining material from the discharge.

In the pre-penicillin era, actinomycosis of the kidney and other deep viscera carried a sinister prognosis. If nephrectomy was technically impossible the patient usually died within a year. Potassium iodide and local irradiation were sometimes beneficial. Later, when the early sulphonamides were used, the first real cures were claimed. One of the earliest of these was a case of actinomycosis and fistula formation following appendicectomy, which was successfully treated with sulphanilimide. Interestingly enough this case was reported by Oliver Walker (1938) at The Queen Alexandra Military Hospital.

SUMMARY

This paper describes an unusual case of actinomycosis with predominant renal involvement. Coincident pulmonary tuberculosis and gall stones added to the clinical confusion.

The relevant literature is reviewed and the important clinical features are emphasised.

The patient cheerfully underwent five operations, but in the last analysis he owes his life to penicillin.

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ECZEMA IN BRITISH TROOPS IN THE FAR EAST

A STUDY OF SOME CASES INVALIDED FROM SINGAPORE

BY

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THE diagnosis of those skin disorders which develop in the tropics seems frequently to be more under the influence of mystique than observed facts. So we find Singapore foot, Hong Kong ear, dhobie itch, sweat rash, monsoon blister, foot rot and a host of other vague terms in use for various commonplace conditions when they arise in a tropical environment.

Whilst there is no doubt that superficial pyogenic and mycotic infections, poral closure syndromes and intertriginous dermatitis are common and trouble-some in a humid tropical climate, there is little to suggest, except in the case of acne, that they lead to much invaliding disability.

Between October, 1956 and February, 1958, 79 British soldiers were invalided from Singapore because of skin disease. Of these 58 per cent had eczema, 29 per cent had acne, 5 per cent had disabling hyperhidrosis of the extremities and the remainder were single examples of a variety of dermatoses.

The patients with eczema could be classified quite easily in the recognised groups of reaction patterns, as follows:

1.	Discoid eczema	•••	25			
2.	Chronic eczema of hands	• • •	6			
3.	Exudative neurodermatitis	•••	5			
4.	4. Contact dermatitis, primary irritant type					
5.	Seborrhæic dermatitis	•••	3			
6.	Contact dermatitis, allergic type		2			
7.	7. Nickel sensitivity type dermatitis					
8. Recurrent dermatitis, hands and feet						
	Total cases of eczema	•••	46			

Long experience has amply demonstrated the uselessness, in many of these cases, of orthodox treatment with anti-eczematous and anti-microbic applications, rest, sedation, the avoidance of frictional and other traumatic factors in

footwear and employment, along with climatic change by air conditioning or treatment in a hill station. On the other hand, the effect of an invaliding medical board in producing dramatic remissions without other change in the patient's environment or treatment, is equally striking.

In the 46 patients under review, orthodox treatment failed completely in 82 per cent, and could only be classed as having good results in one instance. At the time of the invaliding medical board, however, 58 per cent were noted to be improving, of whom 13 per cent were noted as having relics only of their hitherto intractable eruptions. These patients all knew for at least a week beforehand that they were to be recommended for invaliding, and the knowledge of impending escape from their current circumstances was the only change in their situation.

The implications of this phenomenon are borne out by the results of further analysis. Hyperhidrosis of the extremities, with or without a coarse tremor, was found in 39 per cent, including five of the six patients with chronic eczema of the hands, three of the five cases of exudative neurodermatitis and a third of those with discoid eczema.

Twenty patients gave a history of previous skin disease; in 13 this occurred before coming to Malaya. Two had atopy, and five had psychoneurotic symptoms of gross degree, such as crying and shaking attacks, blackouts and tension headaches.

Using a simple technique of unhurried, informal history taking, evidence of emotional disorder was found in half the cases. A third of these were characteristically mildly anti-social, shiftless, with no focus of loyalty, living for the moment only, often from unhappy homes, and sometimes admitting to minor delinquency. A small group were reacting to be reavements, illnesses of relatives, employment troubles and similar common vicissitudes of life, and the largest group (52 per cent) were psychoneurotics.

Relating these three groups to the eczema reaction patterns showed that the minor psychopaths were found almost exclusively amongst the cases of discoid eczema, the only exception being one with chronic eczema of the hands. The small group with reactive emotional disorders all developed discoid eczema whilst the psychoneurotic patients were found amongst those with discoid eczema, chronic eczema of the hands, seborrhæic dermatitis, allergic type contact dermatitis and, of course, all the cases of exudative neurodermatitis.

The different patterns of eczema will now be considered in greater detail.

Discoid eczema

Discs of eczema, often with gross scratch and abrasion marks as well, involving in order of frequency the dorsa of the forefeet, hands, legs and forearms, sides of heels and toes, characterised these cases. Episodes of pyogenic infection were not uncommon, often in association with acute upper respiratory tract infections. Some lesions, especially on the feet, resembled the so-called infective parakeratoses.

Treatment response tended to be characteristic, transient improvement

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following the use of a variety of local applications. Admission to hospital or a period of leave often led to a spurious remission, with prompt relapse on return to duty, often before actual work had been resumed. Therapeutic paradox was sometimes seen, fungicides producing an amelioration and bland applications an exacerbation of the lesions.

The condition usually developed within the first few weeks or months of arrival in the Far East, or even on the troopship, as soon as Suez was passed. Some of the patients gave a history of similar trouble about the time of receiving their first call-up papers.

Three patients with lesions involving the insteps or sides of the heels, whose histories suggested that they had interdigital tinea pedis, were not included in this group, although morphologically and in their clinical course they resembled the others. Fungus could not be demonstrated in their lesions and they derived no benefit from fungicides, but it was felt that their final diagnosis was doubtful. Apart from these equivocal cases, there was no evidence that fungus infection was responsible for any morbidity; in fact, some of these patients had had the common body ringworm of the newly arrived as well, with normal response to treatment.

The following case history is typical: Pte. J. aged 19, a cook. A year previously he had "impetigo" of the face, which took a month to cure. He was then posted to Malaya, and developed "tinea," which took three months to cure (average is three weeks). The rash for which he was eventually referred for dermatological opinion began immediately the "tinea" cleared up.

He was found to have discoid eczema of the forearms and dorsum of the left hand. It itched "a lot," especially on "getting near the ovens." As a result of his skin troubles in England and Malaya he had done about six weeks cooking in the preceding twelve months. Treatment response during this time was classical, initial improvement with a wide variety of applications being followed in a few days by deterioration.

When called up he took a short service engagement because he thought this would give him some say in choosing his corps. He was put in the one corps that he was really anxious to avoid. Two applications to transfer to another corps were refused, whereupon his skin provided the way of escape.

Chronic eczema of the hands

Two broad sub-groups were recognised, those with vesico-squamous and fissured lesions on the fingers and backs of the hands, and those with a dyshidrosiform eruption. All but one had local hyperhidrosis. The two with a dyshidrosiform eruption had severe local hyperhidrosis, no apparent specific emotional disorder, and were both noted to be improving at the time of their medical boards, having resisted all orthodox therapy.

Of the four with dorsal eczema, three had, as expected, irritant local factors operative (petrol and oil; vaseline gauze; hand scrubbing 10-12 times daily). But at rest in a ward their disability persisted until the decision was made to invalid them, whereupon remission began in each case.

The remaining patient was atopic, and had had skin trouble at the age of fourteen. He gave evidence of somewhat poor social adaptation and was little changed at the time of his medical board.

Exudative neurodermatitis

This perhaps rather controversial disorder manifested itself by attacks of exudative dermatitis involving predominantly the face and genito-crural areas, characterised by dramatic exacerbations and remissions that bore no consequential relation to factors such as treatment, infection or clothing irritation. Pus in the exudate often cleared quickly with psychotherapy, if this improved the whole disorder.

Clear evidence of psychoneurosis, which could be related to the state of the skin, existed in all cases, and one showed very strikingly the phenomenon of the alternative symptom, hysterical episodes of shaking and crying occurring when the skin was drying up with treatment, and a return of calm when the skin broke down again. Two were virtually healed at the time of their medical boards, one was healing, and the remaining two, whose troubles were not remedied by repatriation in any case, showed little improvement.

Contact dermatitis, primary irritant type

Two patients had a papular eczema at sites of clothing friction which was non-specific as indicated by history and patch-testing. One had a history of such trouble for eight years, and responded more satisfactorily to invaliding than to rest and bland applications.

The third patient in this group was a dental mechanic with very sweaty hands whose rash developed on the left hand exactly where he held his models and dentures when working on them. The condition did not improve much when taken off work, and he was not patch-tested or observed on re-exposure to work, so his inclusion in this category must be regarded as tentative. None of these patients showed definitive emotional abnormalities.

Seborrhæic dermatitis

Three of the series followed the seborrhæic reaction pattern. None responded to orthodox therapy at all well, but at their medical boards two were noted to be improving and one had relics only of what had been extensive lesions. He also had had body ringworm on arrival in Malaya, with normal response to treatment and gave a history of frequent tension headaches since the age of thirteen. Marked emotional difficulties in relation to personal and employment factors existed, and he had no headaches whilst the rash was present.

Of the other two, one had chronic otitis media and a classical history of spurious remissions and dramatic relapses, on one occasion on the eve of discharge from hospital. The other also had a history and course full of circumstantial evidence of emotional disorder, but rapport was not achieved, and he was invalided home, his lesions improving, without any understanding of his underlying trouble having been reached.

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Contact dermatitis, allergic type

It would be a relief to be able to report two straightforward cases under this heading, but both illustrate only too well the complexities of the eczema problem.

The first patient had a history of minor septic lesions on an ankle for five months, with repeated episodes of acute dermatitis at the sites of, and coincident with, repeated flavine dressings. Appropriate treatment cleared the sepsis without difficulty, but the eczema persisted, resisting orthodox therapy and systemic cortisone. Medical boarding produced little effect and he was evacuated without any further progress having been made. In days gone by he would have been described as having eczema rubrum.

The second patient began with a classical bullous footwear contact dermatitis at a time when he was wearing rubber-canvas boots in a flooded camp. There was a history of a rash on the feet at the age of fourteen, treated by radiotherapy. Response to treatment was normal, but a minor relapse occurred when he walked in some rubber sandals. Recovery from this was followed by another relapse, accompanied by cheiropompholyx, and steady deterioration set in, at rest in bed, removed from all contact with rubber.

He was then studied more adequately, and it was found that there was a background of quite definite psychoneurotic stress, aggravated by the conflict of his educational and cultural standards with his environment as a rifleman. He also developed genuine distress because he felt that he, the first skin casualty in his newly arrived unit, would be thought by his comrades to be a "skiver." This guilt over escaping from his environment persisted, as did his eczema after medical boarding, and it typifies another characteristic though far less common reaction in these patients.

Nickel sensitivity type dermatitis

This was a single case whose troubles began in 1951, and who eventually became intolerant to battledress, woollen socks and leather watch straps as well as nickel. He only came into dermatological hands as a result of applying for an extension of service. He minimised his disability, and said that after-shave lotion helped him more than "all the ointments and stuff" that various doctors had given him through the years.

Recurrent dermatitis of hands and feet

One patient gave a history of repeated attacks of what appeared to be eczema of the hands and feet in the past six years. His mother had had eczema for fifteen years. He was seen whilst in remission, for documentary reasons, and no information was forthcoming on which to base a diagnosis.

DISCUSSION

The opportunities for concealing or enduring skin troubles are restricted in an organisation like the army in which regular medical examinations are held. It is probable, therefore, that the high incidence of emotional disorders in this



series of patients is not due merely to the fact that the emotionally maladjusted naturally gravitate into the doctor's hands.

There was such a frequent sequential relationship between the emotional and somatic events in many of the histories that it became more and more unsatisfactory to offer coincidence as the explanation of what was found. In some instances, as for example in the cases of exudative neurodermatitis, the eczema seemed to be a direct expression of the emotional state. In others, the emotional disability or strain seemed to act either as a precipitating or perpetuating factor in a presumably constitutional type of skin breakdown. Although scratch and abrasion effects sometimes seemed to dominate the picture, simple self-inflicted injury to the skin was not seen.

The dominant motif in the series was failure of adaptation to the circumstances of military service and separation from the home environment, because of the defects of a neurotic personality or lack of a properly developed social conscience. For this reason psychotherapy is never likely to help these patients unless it is combined with environmental relief. This statement might prove to be unduly pessimistic if a trial were to be made of the effect of early diagnosis and treatment of these cases. Many were so disillusioned by months of unsuccessful treatment for "tinea" and other fictitious diagnoses before specialist help was sought that there was little hope of arousing any will to recover. That there are grounds for some hope is suggested by the following case, although the outcome was a failure. He was a driver, aged 19, who developed dermatitis of the dorsa of his forefeet after being in Malaya for five months. There was no relevant physical, personal or family history. He had not been subjected to multiple fungicides and was referred for advice relatively early (eleven weeks from the onset).

He came from an unhappy home and did not want to serve in Malaya. After discussion, explanation and sedation, the rash dried up and it looked as if long term invalidism might be prevented. At this point, however, he received a letter from his mother, who was his favourite parent, telling him that she had had to give up work because of a weak heart. He relapsed, showed no further interest in recovery, and had to be invalided home.

Another factor which makes treatment of these patients difficult is the widespread belief that Malaya and Singapore are hotbeds of intractable tinea of the hands, feet and crutch. This belief is unfortunately reinforced by the many medical practitioners whose automatic response to lesions in these areas seems to be to prescribe fungicides. The effect of this myth is seen in the usual response of these patients to the questions "How long have you had this rash?" and "Have you had any skin trouble before?". The answers, almost without fail, are "Since I came out here" and "Not before I came out here".

The idea of incurable disease caught in the tropics is a comfort to the feelings of the patient in whom a cutaneous escape-mechanism is operating, but is an offence to the physician trained to look critically at what he sees. Recognition of the factors that are really operative in so many of these cases has in addition a valuable effect in protecting both patient and doctor from the demoralising

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effects of treatment frustration which develop as all the pastes and ointments on the shelf fail to cure the outward signs of inward discontent. As a final consideration dissemination of the view that service in the tropics carries with it very little risk of acquiring intractable skin troubles should have a helpful effect on the morale of those who might otherwise be adversely affected by fear of this eventuality.

SUMMARY

79 British soldiers were invalided from Singapore to the United Kingdom between October, 1956 and February, 1958, because of skin disease. 46 were suffering from eczema which morphologically followed accepted reaction patterns.

Orthodox therapy failed in 82 per cent. An invaliding medical board resulted in a remission in 58 per cent, without any other change in their situation. (The duration of this remission is a matter for further investigation, and is probably temporary in many cases).

39 per cent showed evidence of nervous tension, and 57 per cent had histories of previous skin troubles, atopy, or neurotic manifestations such as blackouts or tension headaches.

50 per cent showed clear evidence of psychoneurosis, reactive emotional disorder or minor psychopathic traits, and the emotional and somatic events in their histories were frequently correlated.

Fungus disease played no part in the course of events, and the opinion is expressed that the time has come to abandon obsessions with tinea, as far as invaliding disability in Singapore and Malaya is concerned.

Because eczematous breakdown so frequently has all the characteristics of an escape from an intolerable situation, it seems that formal psychotherapy is likely to fail in many cases, but it is possible that early diagnosis and treatment might lead to less disability and wastage of manpower.

The beneficial effect on morale of an altered attitude to skin diseases in the tropics is considered.



A NOTE ON THE USE OF DARAPRIM AS A MALARIA PROPHYLACTIC IN NIGERIAN TROOPS AND THEIR FAMILIES

BY

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In the late summer of 1957 the medical officer of a Nigerian infantry battalion stationed in Eastern Nigeria reported that both he and the commanding officer were concerned about the anticipated epidemic of malaria which experience in previous years indicated was likely to occur in the autumn both during and after the annual rains. A disquieting feature about previous epidemics was the frequency of cerebral malaria in infants associated with a high mortality.

Investigation of the unit showed that with the exception of wearing long trousers and sleeves rolled down when on guard duty or exercises Nigerian soldiers took no personal anti-malaria precautions. Anti-mosquito measures undertaken were residual spraying of quarters and oiling of static water in the barracks area. The barracks occupied by the battalion were ideally sited for the maintenance of a high incidence of malaria. Within half a mile of the low hill on which the barracks lie is a small river with swamp on either edge. On the other side of the river is a large village which provides a large reservoir of infection in addition to the soldiers themselves.

A mosquito control scheme was planned but was not practicable. Most of the work would have had to be done on private property the owners of which refused to co-operate. The only measure which seemed to promise any hope of success was individual chemoprophylaxis on the lines of the paludrine used universally in the British Army and by British personnel seconded to the Nigerian military forces. This prompted enquiries as to why chemoprophylaxis had not been used before in Nigeria. Mepacrine had been used by the West African Expeditionary Force in S.E.A.C. in the Second World War but was discontinued on return to West Africa. Enquiry showed that chemoprophylactics were not given for two main reasons. First it was stated that prophylactics, by preventing recurring attacks of malaria, would destroy the Nigerian's partial immunity to the disease, so that, when a prophylactic was discontinued (e.g. when the soldier was discharged from the army) the individual would suffer severely from malaria and might well succumb from complications such as cerebral malaria or blackwater fever. In addition to this, an attack of malaria in the partially immune Nigerian adult is a relatively mild disease lasting up to two days once or twice in the year. The other major reason for not using chemoprophylactics was that of expense, though with the increasing tempo of Nigerianisation of the army, the loss of key manpower and cost of malaria treatment was becoming a major consideration.

The malariologist to the Nigerian government was asked to advise on the problem. He described two trials which he had carried out in village communities in different parts of Nigeria which showed the value of Daraprim as a chemoprophylactic. His experience did not bear out the hypothesis that cessation of the drug was associated with severe attacks of malaria. He advised Daraprim in a dosage of 25 mg. once per week with half dosage for children under seven years of age. He further advised that this was the minimum safe dosage in his experience if Daraprim resistance was to be prevented. Funds available would only permit of a dosage of 25 mg. per adult every 14 days with the appropriate half dosage for children under 7 years: it was therefore decided to commence chemoprophylaxis at this dosage and to increase the dosage later if more funds became available and the scheme appeared successful. This was done in July, 1958.

The results are tabulated below with comparable figures from two other infantry battalions in other Nigerian stations (with comparable climate) which

Table 1. Incidence of malaria in Nigerian soldiers on Daraprim (Battalion A) compared with two similar groups (Battalions B and C) not given Anti-Malarial Prophylactics.

		·				- ·	
MONTH		BATTALION A		BATTALION B		BATTALION C	
		Number of cases	Attack rate /1000/month	Number of cases	Attack rate /1000/month	Number of cases	Attack rate /1000/month
		No I	Daraprim				
1957			1 1				
JULY		31	42	No report	-	No report	
August		36	46	19	30	No report	
SEPTEMBER		13	18	28	42	No report	
OCTOBER	•••	15	21	36	55	20	29
Daraprim o	omm	enced in Ba	ttalion A—				
November	ry 1+	uays. 1	1.3	16	23	34	49
DECEMBER DECEMBER	•••	7	9	25	36	32	46
1958	•••	,	, ,	. 23	30	32	70
JANUARY		2	2.7	28	40	43	59
FEBRUARY		1	1.3	50	71	82	115
MARCH		0	0	ğ	14	33	46
APRIL		2	2.6	14	22	31	43
MAY		2	2.7	50	74	42	52
JUNE		2	2.7	35	52	41	57
Daraprim of to 25 mg. e							
JULY		8	11	44	62	4 0	53
AUGUST		0	0	38	54	29	40
SEPTEMBER		1	1.8	16	29	32	44
OCTOBER		1	1.3	10	16	37	52
November		1	1.4	16	29	65	89
DECEMBER 1959	•••	5	7	8	14	61	84
JANUARY		1	1.3	7	13	63	89
FEBRUARY		1	1.5	11	18	22	30
MARCH	•••	1	1.2	7	13	28	39

Average monthly attack rate/1000 (since Daraprim commenced): Battalion A 3.4; Battalion B 35; Battalion C 58.

were not on Daraprim. As will be seen the results are most encouraging. Malaria has virtually disappeared amongst the soldiers and has been very much reduced in their families. The difficulties of ensuring that the family actually consume their Daraprim accounts for the disparity in results between soldiers and their families. The soldier consumes his "tablet" on parade and at the same time is given tablets for his family—it is not practicable to parade the family. Cerebral malaria in infants has disappeared which, however, shows that a large proportion at least of the families are getting their tablets. Much of the success of the scheme has been due to the energy and enthusiasm with which the scheme has been put over to the soldier by his officers both regimental and medical.

Since this trial the scheme has been extended to cover the remainder of the Nigerian military forces.

Comment

The striking reduction in malaria incidence in Battalion A is noteworthy. That the incidence of malaria has not been reduced to nil every month is mainly due to the arrival of new intakes of recruits (not on Daraprim previously) and individuals missing their Daraprim, though the possibility of Daraprim resistance

Table 2. Number of cases in Nigerian Soldiers' Families. (Approximately 500 adults and 800 children in each station.)

Month	Battalion A	Battalion B	Battalion C	
1957	No Daraprim		1	
JULY	101	No report	No report	
August	110	70	No report	
SEPTEMBER .	74	37	No report	
October .	105	53	60	
talion Å. Adults				
14 days : half o under 7 vears	lose for children		1	
NOVEMBER .	50			
December .	14	45	75	
1958	•••	42	80	
JANUARY	12	50	120	
February .	' 8	85	80	
March	1	30	64	
April	10	46	69	
May	17	56	95	
June	10	50 64	96	
	age increased to			
	days: half dose			
for children ur		44	74	
JULY	20	66 68	71 68	
August	13	62	68	
SEPTEMBER .	27	62 4 5	85	
October				
November .	14	1 2	125	
December . 1959	22	35	107	
JANUARY	5	53	76	
February .	1	No report	56	
March	0	21	98	

building up will have to be closely watched. From March, 1958 to March, 1959 practically every soldier of Battalion A took his annual leave of one month during which time he was not given Daraprim. This does not seem to have given rise to cases of malaria, a point carefully enquired into by the unit medical officer (Table 1.).

The precise numbers of wives and children cannot be determined. No record is kept by the Army of a soldier's family. It is assumed that he has only one wife for allowance and quartering purposes but this number is frequently exceeded. Also the number of children born is relatively large with a very high infant mortality. For these reasons no attack rates have been worked out. The figures obtained do, however, show the marked improvement obtained where Daraprim is offered to the Nigerian soldier for the protection of his family against malaria (Table 2.).

In spite of the improvement the periodicity of malaria is still present: March, 1958 and March, 1959 both having the lowest incidence. March is usually the last dry month before the rains which commence in April and continue on into September, with occasional rains up to December, after which practically no rain falls till the succeeding April.

A CASE OF PSEUDOMYXOMA PERITONEI

RY

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THE term pseudomyxoma peritonei was first used by Werth (1884) to describe massive accumulations of gelatin in the peritoneal cavity resulting from rupture of a pseudomucinous cystadenoma of the ovary. Fraenkel (1901) used the same expression to describe the clinical picture resulting from rupture of a cyst of the appendix. The case described here is a patient who presented with a mass of myxomatous tissue in a hernial sac and died of the condition without other disease eight years later.

CASE REPORT

Major J. A. was a retired Indian Army officer who first reported sick in 1949 aged 59. He complained of a lump in the right groin of two years' duration, progressively enlarging. It was painless, disappeared on lying down, and was controlled by a truss. Examination showed a thin, healthy-looking man with a large reducible right indirect inguinal hernia. He was admitted to hospital and herniorrhaphy was performed. At the operation a large sac was found behind the cord, the sac contained excess peritoneal fluid and attached to the wall was a tumour, one inch in diameter, with a hyaline granular appearance. Nothing abnormal was palpated through the neck of the sac.

Microscopy of the tumour revealed an irregular collection of mucoid material lying in a loose connective tissue matrix, a small number of glands lined by columnar epithelium, a small number of spaces lined by cuboidal epithelium and a base composed of a loose connective tissue merging into a well-differentiated fibrous tissue.

A diagnosis of pseudomyxoma with no evidence of malignancy was made. After operation a barium meal and "follow through" were undertaken, but no abnormality was detected. He was observed at intervals and remained well until April, 1952, when he presented with a reducible hernia, of short duration, in the left inguinal region.

Herniorrhaphy was performed and there was found a large sac containing pellets of mucoid material with clusters of similar material on the sac wall and in the peritoneal cavity. Histology of the material was identical with that of 1949. A barium meal and "follow through" were repeated and showed multiple diverticula in the large bowel.

In November, 1953, there was a recurrence of the right inguinal hernia but the patient was well and his weight constant. Examination showed upper abdominal distension but no masses were palpable. In the right groin there was a rubbery hard mass, one inch in diameter, which was easily reducible. At this stage the patient declined further investigation and treatment.

He was next seen in November, 1957, when he complained of six months' abdominal distension and indigestion. His indigestion took the form of considerable flatulence and "heart burn" on lying down. The "heart burn" was worse at night, sufficient to keep him awake, relieved by vomiting but not by antacids. In spite of anorexia his weight had increased by one stone during the preceding three months. He was able to walk for a mile without dyspnæa.

Examination revealed a very wasted man with gross abdominal distension, the circumference at the level of the umbilicus was forty-two inches. The umbilicus was replaced by a lump, three inches in diameter, rubbery hard, lobulated and subcutaneous. The overlying skin was thin and blue in colour, like a thin-walled cyst. There was a mass of indefinite shape across the upper abdomen. Shifting dullness could not be demonstrated. Over the right external inguinal ring was a rubbery hard mass, irreducible, and without a cough impulse. A mass the size of an apple protruded from the anterior wall of the rectum above the prostate. There were no glands palpable. He had pitting ædema up to the knees.

In January, 1958, a laparotomy was performed and twenty pints of jelly-like fluid were evacuated. The cæcum and ascending colon were identified. They were surrounded by a mass of colloid material making it impossible to examine the cæcum fully and the appendix could not be identified. The greater omentum was replaced by a hard mass adherent to the abdominal wall. The remainder of the intestine could not be examined due to adhesions. No therapeutic procedure was undertaken.

After operation his condition never returned to normal. The wound healed

satisfactorily but the abdominal distension returned within fourteen days of the operation. He became thinner and eventually died.

Post-mortem examination showed that the lump in the right groin was a mass of myxomatous tissue lying over the external ring; no hernia could be demonstrated. Pseudomyxomatous tissue filled the abdominal cavity apart from the viscera. These were all covered with the jelly yet none showed invasion. The orifice of the appendix in the cæcum was found, but the body could not be found in the adjacent myxomatous tissue. No other abnormalities were found, other than terminal broncho-pneumonia in the lungs. The histology was in agreement with that already described. As the appendix could not be demonstrated and appendicectomy had not been performed, it was assumed the condition arose in the appendix and had destroyed it.

COMMENT

Pseudomucin or pseudomyxoma is mucoid tissue allied to mucin but does not give the typical reaction with acetic acid. It is generally agreed that there are two sources of pseudomyxoma, from ovarian tumours and from the appendix.

Four modes of development from the ovary have been suggested:

- 1. As a result of overgrowth of one component of a teratoma.
- 2. As a result of a serous cystadenoma undergoing metaplasia.
- 3. As a separate tumour allied to the Brenner tumour.
- 4. As a derivative of Müllerian remnants.

The third is the generally accepted view.

Trotter (1910) summarised the likely modes of origin from the appendix as follows:

- 1. Obstruction of the appendicular lumen due to either fibrosis or carcinoma of cystic type, resulting in a mucocele which subsequently ruptures.
- 2. Rupture of a diverticulum.
- 3. Cystic degeneration in the wall of the appendix.

It was formerly thought that most cases were caused by rupture of colloid carcinomas of the appendix (Masson & Hamrick, 1930; Woodruff & McDonald, 1940), but it is more likely that these tumours were hyperplastic but benign epithelial masses.

The rarity of pseudomyxoma is explained by the rarity of the predisposing conditions. McCarthy & McGrath (1911) described only seventeen diverticula in the course of five thousand appendicectomies, while Castle (1915) found mucoceles in 0.2 per cent of thirteen thousand post-mortems. Cystic degeneration was found in 0.5 per cent of post-mortems performed by Seelig (1920). Carcinoma of the appendix is a rare condition and only eight per cent of the total are of the cystic type (Uihlen & McDonald, 1943). Out of two thousand appendices removed over the last ten years at University College Hospital there have been no diverticula, no carcinomas, and three mucoceles.

The mode of spread throughout the peritoneum is difficult to explain. All

the suggested modes of development postulate rupture of an abnormal appendix, or production of myxomatous material by the peritoneum possibly as a result of stimulation by the presence of near-by colloid. This seems an unlikely response.

In most of the cases described the myxomatous tissue has contained epithelial cells, suggesting that rupture of some hollow organ occurs scattering cells in the peritoneal cavity, producing pseudomucin but not invading the peritoneum as in the case described. Waugh & Findley (1937) described a case in which there was an infiltrating carcinoma showing a high mucus secretion, but this appears to be an exception to the rule.

In order to explain the usual involvement of the omentum, Gardham, Choyce & Randall (1928) suggested that, when the abnormal appendix ruptured, the omentum covered the region and that some cells became attached to the omentum and proceeded to live a parasitic existence.

In 1928 Naeslund did an interesting series of experiments. He tied appendices in young rabbits and then cut them below the ligature whilst preserving the blood supply to the distal portion. In the majority of cases mucous cysts developed in the appendix and spread occurred throughout the peritoneal cavity without infiltration. These experiments suggest opening of the lumen to the peritoneum and disturbance of continuity with the rest of the gut may be of importance in the development of the condition.

Diagnosis is rarely made before laparotomy. Brennan, Fletcher & Kyle (1959) however describe two cases in which diagnosis was made provisionally in a case of abdominal distension as a result of failure to obtain fluid at paracentesis. They suggest that when a fluid thrill is present in the abdomen, failure to demonstrate shifting dullness or to withdraw fluid on paracentesis should suggest the diagnosis. In confirmation of this, shifting dullness could not be demonstrated in the case described. The diagnosis can be confirmed by peritoneoscopy (Tedeschi, Gaston & Brown, 1949). The case described did not have calcification in the right iliac fossa which Brennan et al. (1959) mention as an aid to diagnosis.

Pseudomyxoma peritonei is extremely resistant to treatment and is invariably fatal. There is little hope of success with radio-isotopes due to matting by adhesions. The ultimate cause of death is usually cachexia due to pressure and adhesions, as in this case. In the end deterioration is sudden, until then a striking feature of these cases is the contrast between the well-being of the patient and the advanced signs in the abdomen.

SUMMARY

A case of pseudomyxoma peritonei is reported. The condition first presented as an inguinal hernia in a man of fifty-nine who ultimately died aged sixty-seven of cachexia due to abdominal distension and adhesions. The ætiology and mode of spread are discussed.

It is a pleasure to thank Mr. A. J. Gardham, Senior Surgeon, University College Hospital, for his permission to describe this case and for his help in the preparation of this paper.

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Editorial

A NEW ARMY BLOOD SUPPLY DEPOT

THE Army Blood Transfusion Service organised by Sir Lionel Whitby during the last war was the first of its kind and the model for subsequent transfusion services formed by our allies.

It was based on the Army Blood Supply Depot at Bristol and one of the most important factors to which its success was due was the responsibility of the A.B.S.D. for providing the transfusion needs not only of the Army but also of the civilian hospitals in the South West of England from where it drew most of its donors. There it was responsible for giving clinical advice and practical assistance in the treatment of civilian patients and casualties as well as for the supply of blood, dried plasma, crystalloids, grouping sera and equipment. The A.B.S.D. thus became a most important part of the blood transfusion service of the Emergency Medical Service and by reason of its extensive and in many ways unique practical experience, exerted a considerable influence upon the technical and administrative evolution of what has now become the National Blood Transfusion Service.

These circumstances provided the A.B.S.D. with continual practical work on a large scale and a stimulus for research and development essential for an efficient and progressive unit. The A.B.S.D. also provided ideal conditions for training medical officers and other ranks in all transfusion work and especially in the practical aspects of the collection, care and giving of blood and blood grouping.

In 1946 the Army Blood Supply Depot and all Base and Field Transfusion Units were disbanded and the buildings and some of the equipment of the A.B.S.D. were taken over by the South West Regional Transfusion Centre of the National Blood Transfusion Service.

In future the main responsibility for the supply of whole blood to the Army in the United Kingdom and in the event of war to theatres overseas accessible by air, would rest with the Ministry of Health and the National Blood Transfusion Service. They would also assist in the practical training of personnel and provide dried plasma and grouping sera. The Army established a 190 Editorial

transfusion department at Everleigh to prepare crystalloid solutions and equipment and set up cold storage plant there for the reception and dispatch of whole blood received from the N.B.T.S. in time of war or other emergency. Overseas the Army organised transfusion services of varying complexity as occasion demanded but not without difficulty because of the lack of experienced personnel.

This joint arrangement appeared satisfactory so long as it seemed that the N.B.T.S. would be able to be the main source of blood in the event of war. It was soon realised, however, that the disruption of communications following an atomic attack would make this most unlikely and in the worst case no supplies would be available in the early stages where most wanted. The sole source of blood might of necessity be provided by collecting and grouping on the spot. This would necessitate not only the dispersal of reserves of equipment for the taking and giving of blood but also the development of the simplest techniques and the training of as many people as possible including "auxiliaries" in their use. Attempts to this end have been made: for example, the introduction of the Fenwal Pack and plastic disposable sets has simplified techniques for the collecting and giving of blood.

The curtailment of the responsibilities of the Army for the provision of blood, however has made training difficult and often unrealistic. Attempts to overcome this by organising collecting teams both at Everleigh and Aldershot have had little success and proved abortive. In any event the objective of these arrangements was too limited and frustrated by the knowledge that should the Army teams fail to reach the target of blood required, the civilian service would make good the deficit.

The provision of plastic transfusion equipment and crystalloids from commercial sources has recently further limited opportunities for gaining practical experience and training in the Army so that now, although everyone is fully aware of the increasing importance of blood transfusion in war, service medical officers in the U.K. at any rate find themselves without the practical advantages of an active and complete transfusion service of their own. They find it difficult to acquire the experience and knowledge open to those in the N.B.T.S. and other services in the U.K. where a centre may be responsible for providing the transfusion needs of a population of perhaps three to four million people.

In order to improve this state of affairs and enable the Army to build up once again a body of knowledge, skill and experience such as that so laboriously acquired during the last war, it has been decided to re-establish, albeit on a much reduced scale, an Army Blood Supply Depot at Aldershot.

It will differ from its predecessor in that its responsibilities will be largely confined to the provision of blood and transfusion facilities for Army hospitals in Southern Command and London District. For administrative reasons it will not be possible for it to share responsibilities with the N.B.T.S. for civilian hospitals in the area. Nevertheless its task will be considerable and the unit should provide a steady background of practical work and experience the need for which has been increasingly felt since the disbandment of its predecessor in 1946. We wish it every success.

Book Reviews

PRACTICAL FOOD INSPECTION. C. R. A. Martin, M.B., B.S., D.P.H. London: H. K. Lewis & Co. Ltd. 1959. Pp. 656. Illustrated. 63s.

This is a well-established textbook, first published in 1932. The present edition, presented in a single volume, falls into two parts: Part I dealing with meat inspection and Part II covering fish, poultry and other foods. The layout is excellent, the paper good and the printing clear.

It should prove very useful for public health students particularly, and also as a reference book for public health inspectors whose work covers the whole field rather than the narrow speciality of meat inspection only. For the latter, a more comprehensive textbook is necessary. Some of the line diagrams could be improved by substitution of photographs or coloured plates.

To sum up, this textbook is easy to read, clear and concise, and provides much in the way of general information on a very wide subject for the general reader rather than the expert.

W. S. M.

ELEMENTARY MEDICAL THERAPEUTICS. G. F. Walker, M.B., F.R.F.P.S. Bristol: John Wright & Sons Ltd. 1959. Pp. 64. 7s. 6d.

The reader is told in the preface that the "theme of this little book is that it is better to know a few drugs thoroughly than a large number vaguely." There are many omissions, for example, potassium deficiency in chlorothiazide administration. Many doses are stated without a mention of the frequency with which they should be given. Occasionally a pharmacological action is imperfectly explained owing to overcrowding in one sentence. The names of the drugs could have been printed in heavy type; too often the eye rests on the word "note" in pale italics where the name of the drug is usually placed on the page.

The book is written for senior students and house officers; it will be of especial interest to those who know their therapeutics already but need a simple reminder in their pocket.

W. R. M. D.

THE MEDICAL ANNUAL. (77th Issue). Edited by R. Bodley Scott and R. Milnes Walker. Bristol: John Wright & Sons Ltd. 1959. Pp. 672. Illustrated. 42s.

Year by year the Medical Annual grows in size. This year it has added nearly 50 pages to its girth. There are some noticeable departures from the editorial staff. The late Sir Henry Tidy had felt the time had come to resign the medical editorship and the publishers have paid him the graceful compliment of his photograph on the frontispiece and some words of appreciation of his 25 years service. His place is taken by Dr. Bodley Scott. Another familiar author is missing from this edition. Sir Philip Mansor-Bahr is succeeded by our own Major-General W. R. M. Drew, who contributes the section on Tropical Medicine.

The Annual remains what it has always been, a volume covering new work on all aspects of medical practice. It is essentially a book for the general practitioner.

He will find within its covers recent advances in such varying subjects as the birth-rate and blastomycosis. The broad scope of the book and the short space available for each article enforces a succinct, compact style upon the contributors, but references are adequate for further reading. Perhaps too much detail is given to operative procedures. There are 40 illustrations and 266 plates. The quality of the photographs and X-ray plates is excellent. This book is "required reading" for the general practitioner and for the specialist who wishes to keep abreast in fields other than his own.

R. J. G. M.

PSYCHOLOGY, THE NURSE AND THE PATIENT. Doris M. Odlum, M.A. (Oxon.), B.A. (Lond.), M.R.C.S., L.R.C.P., D.P.M., D.I.P. (Ed.). London: Iliffe & Sons Ltd. 1959. Pp. 200. 15s.

Now that the patient is looked upon as a complete human being, rather than as a body with a number of diseased organs, it is increasingly important that the nurse should have some basic knowledge of psychology. This book provides this in broad outline, comprehensive, yet in simplified language. It should be read by everyone concerned in general nursing and there is no doubt that the nurse who does will have a better understanding of her patient whether in the surgical or the medical ward. The book is also a useful primer to the nurse undertaking training in psychiatric nursing and all medical students would benefit from its use.

I. M.

A PRACTICE OF ANÆSTHESIA. W. D. Wylie, M.A., M.B. (Cantab.), M.R.C.P., F.F.A.R.C.S. and H. C. Churchill-Davidson, M.A. (Cantab.), F.F.A.R.C.S. London: Lloyd-Luke (Med. Books Ltd.). 1959. Illustrated. 105s.

A textbook on anæsthesia from the pens of two such eminent teachers and exponents of anæsthetics might be expected to prove an exceptional contribution to the literature on the subject. The reader will not be disappointed. The authors present in one volume a comprehensive and most informative account of the modern practice of anæsthesia, supported throughout by detailed reference to the anatomy, physics, physiology, pharmacology and pathology relevant to each particular aspect of anæsthetic technique. A novel system of arranging the subject matter in sections devoted to the various systems of the body has been used with notable success.

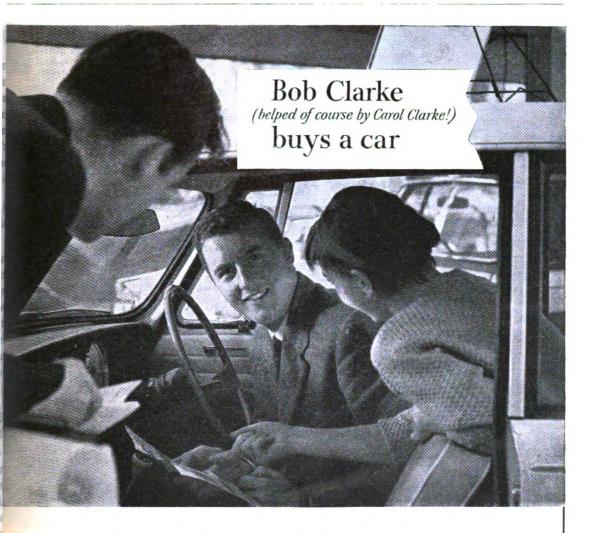
The text is eminently readable and the diagrams and illustrations are of exceptional clarity and quality. Here, indeed, is a reference book which should be at every anæsthetist's elbow, and it will prove invaluable to those who are working for their higher qualifications in anæsthesia.

K. F. S.

A Synopsis of Skin Diseases. Bethel Solomons, M.A., M.D., F.R.C.P.I. Bristol: John Wright & Sons Ltd. 1959. Pp. 272. 30s.

The present volume is comprehensive and omits virtually nothing. The section on fungus infections is a good deal better than that in many larger text-books. One of the poorer chapters is on treatment, nevertheless it is a useful reference book for the non-specialist.

P. C. M.



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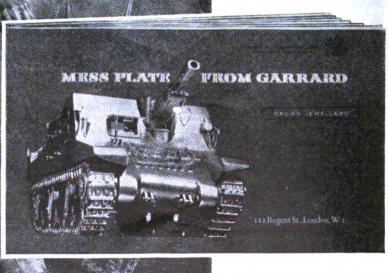
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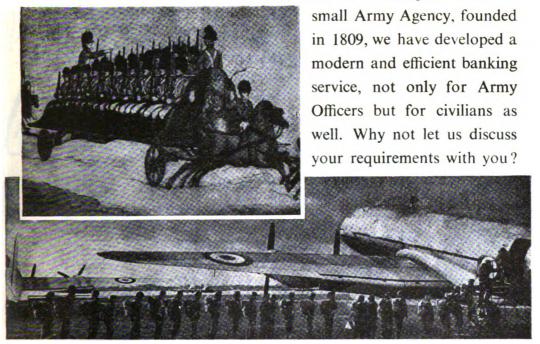
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COLLEGE CENTENARY NUMBER

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Vol. 107 No. 1
JANUARY 1961

IMPORTANT NOTICE

THE Journal was founded in 1903 to publish among other things: "(1) Original articles written by officers of the Royal Army Medical Corps and others. (2) Bibliographical notes on articles of importance and interest to the military services. (3) Re-prints and translations from military, medical and other journals. (4) Official gazettes and official information generally bearing upon the Army Medical services." This outline has changed little. The Editor is still glad to receive articles, reports, notes, letters, or reviews, from any author, in or outside the R.A.M.C., on professional or personal matters, and he particularly welcomes anything of a non-specialist nature.

All papers intended for publication must be submitted in original type-written copy, double or triple spaced, on one side of good foolscap with generous margins, fully corrected. Any paper not up to these standards may be returned. Authors whose material is based on Service experience are reminded of *Queen's Regulations* (1955), amended July, 1957, para. 680. and are asked to send a copy to the Editor at the same time as writing to PR 1 (a).

There is no set style, but *all* abbreviations must be avoided. Contributors are on the increase and, with constantly rising costs of production, their papers must be brief. Papers are accepted on the understanding that they are subject to editorial revision, including alterations to condense or clarify the text, and omission of tables or illustrations. Titles must be brief and, if possible, attractive. Lists of References must be on a separate sheet, in alphabetical order, and limited to those mentioned in the text, where they should be in the form "Makewater (1962) observes . . ." or "(Makewater, 1962)." The Harvard system for bibliography is recommended and abbreviations must be according to *World Medical Periodicals*, 2nd Edition (1957).

The main author of each paper will receive a proof, which should be corrected and returned to the Editor swiftly. The submitted typescript is assumed to be ready for printing without further alteration. Allowance is made for reasonable corrections; unreasonable corrections may be disallowed, or charged to the author. An author who subscribes to the *Journal* is entitled up to 50 reprints free, divided between the authors of a joint paper.

All communications or articles accepted and published in the *Journal of the Royal Army Medical Corps* will (unless the author reserves the copyright to himself) become the property of the Journal Committee, who will exercise full copyright powers. They are, therefore, accepted on condition that they are offered to the *Journal* alone.

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EDITORIAL

As readers may have noticed, a new Honorary Editor has been appointed. His first duty is inescapable and welcome. Colonel Sayers, who has relinquished his appointment on posting overseas, has edited the Journal for five years, during which the job has been far from easy. He took over the Chair, together with the Command of The David Bruce Laboratories at Everleigh, from Colonel John Neal when that remarkable officer was on his death bed. Colonel Sayers has more than maintained the high standards set by his predecessors in the true spirit of an amateur, cheerfully and tolerantly. Anyone who has had dealings with the Journal will know how hard and how long he worked for it and how helpful he has been to so many people, not least to the Corps as a whole. It is a pity that an editor must be self-effacing, for although every page carries the imprint of his personality, this can only be realized by the very few who know as much of it as he does himself. The medical editor must be ready always to put his contributors or his readers before even his own family, as every doctor does for his patients' sake. Colonel Sayers has certainly acted by these ideals and he would be the last to expect this kind of tribute. Nonetheless, he can be assured that his achievement, impelled by his sense of duty to the Corps, will not fail to be appreciated by every reader of this Journal.

This is not the best time for an Editorial on the College. To write about the Centenary is made both easier and more difficult by an article from the late Colonel John Neal which appeared in this *Journal* only four years ago¹; it is packed with information gathered from the College archives and obtainable nowhere else. Although it could

¹ NEAL J. B. (1957). The history of the Royal Army Medical College. J. roy. Army med. cps. 103, 163-172.

2 Editorial

scarcely represent Colonel Neal's finished views on the subject (it was edited posthumously), it must stand as the main authority. In this issue we have tried to augment this branch of the Corps history, but such a job required years of study and cannot be done hastily. Nonetheless the Professors have responded readily to the demands made upon them at short notice, and our readers will find a further array of facts based on careful search in widely scattered records, together with broader and more attractive perspectives taken from this place of vantage at the end of 100 momentous years.

We are anxious not to let the routine publication of papers be crowded out by Centenary articles, and so further articles from the Advisers in special subjects, from the Librarian and from others interested in the College, will be held over. We are glad to have in this issue an article by a non-commissioned officer, for we must always remember how much the College depends in its daily work upon other ranks. The Centenary articles are rounded off by a short account of the V.C. Room by Major General W. D. Hughes, which nicely recalls his devoted work as Commandant, and an unusual article from Sir Harry Verney, which is introduced by an accompanying note. We are pleased to print the Inaugural Ruscoe Clarke Memorial Lecture; its subject matter covers many of the topics which our Director General has made his special concern during his eventful term of office, and we think our readers will agree that to give this first lecture was an honour which he well deserved and which the Corps may share. We are also glad to have an account from Colonel Lassen of military medicine in the Congo last summer.

The Editor is glad to have had this chance of working with the various departments in the College, for this number marks the return of the Journal to Millbank, where it finds a natural home and a pleasant welcome. The Journal, like the College, was conceived a good time before the Corps itself was formed, but gestation took many years. A letter from the Director General of the time, Sir William Taylor, in the first few pages of the Journal is quoted in the Editorial Notice inside our front cover: the whole letter makes clear how close a relationship the Journal has enjoyed with the Library at the College. There are many opportunities for co-operation in reviewing books, providing references to the literature and in maintaining the history of the Corps. We are now looking forward to the Centenary of Sir William Leishman in 1965. The Librarian, Mr. Davies, has drawn up a bibliography: we propose to make it available to any one who is preparing for the celebrations in four years time, hoping that if every one concerned works with this valuable document it will be exhaustive in every detail and ready for publication at the time of the Centenary.

We note in one of our mass-circulation contemporaries that "Major-General H. E. KNOTT will succeed Lieutenant-General Sir Alexander Hood as Director-General, Army Medical Services, in April." This only shows how far rumour can go.

¹ TAYLOR, Sir William. (1903). J. roy. Army med. cps. 1, 1-4.

² Brit. med. J. 1961, 1, 66.

CENTENARY CELEBRATIONS

ROYAL ARMY MEDICAL COLLEGE

26th October, 1960

Brigadier W. H. HARGREAVES
O.B.E., F.R.C.P.

Director of Medicine and Consulting Physician to the Army

HER Majesty Queen Elizabeth the Queen Mother's affection for the Royal Army Medical Corps is evident from the fact that this was the fourth occasion on which she had found time in her busy life to honour Millbank with her presence. This visit for the Centenary Celebrations of the College, proved to be the most outstanding. Rain fell unceasingly throughout the day, but fortunately the deluge decreased somewhat at the time of Her Majesty's arrival at the parade ground behind the College, where an immaculate Guard of Honour, consisting of recruits from the R.A.M.C. Depot, awaited her with the Corps Staff Band. The Colonel-in-Chief was received by the Director General who presented the Representative Colonel Commandant, and after the Royal Salute Her Majesty, wearing a rain-coat and carrying an umbrella, inspected the Guard. Completely unhurried, she stopped several times to speak to its members.

The Secretary of State for War, the Right Honourable John Profumo, O.B.E., M.P., and other dignitaries with their wives, were gathered at the College entrance and preceded Her 'Majesty to the Lecture Theatre. Included in the distinguished gathering were the Medical Directors General, or their representatives, of the Royal Navy, the Royal Air Force, Commonwealth, N.A.T.O., C.E.N.T.O., A.F.N.E., and S.E.A.T.O. nations, Sudan and Yugoslavia. Their uniforms and those of the Nursing Officers and members of the Corps, together with the academic gowns of the members of the Army Medical Advisory Board and the College staff, made up a glittering spectacle. The Presidents of the Royal Colleges of Surgeons were particularly prominent on the platform in their splendid robes of office. Her Majesty, looking strikingly gracious and charming in the gown of a Fellow of the Royal College of Surgeons of England, then entered, escorted by the Director General, and took her place in the centre of the platform. A fanfare of trumpets was followed by the National Anthem and a prayer, and Her Majesty was presented with a bouquet by a scarlet-caped Nursing Officer.

The address of welcome was given by the Secretary of State for War. He told Her Majesty how greatly her visits were appreciated and how stimulating they were to all ranks of the Corps and their wives. On this occasion a crèche for young children was being run in order to allow mothers to be present. He outlined the history of the College from its early days at Fort Pitt when Miss Nightingale, its originator, was

driven to despair by the complete lack of interest on the part of the War Office, which she wished "were in Timbuctoo." On the opening day, when no authority had yet come for money and instruments, the first batch of students found no classrooms or apparatus and concluded that the whole thing was a hoax. With that pathetic situation he compared the high status of the College today and the academic achievements of officers attending its courses. No fewer than 56 per cent of the regular medical officers have one or more post-graduate qualifications and 25 per cent have higher qualifications. The College is keeping ahead with its research work and its strength lies in its close liaison with civilian authorities, research groups, and the major hospitals.

Her Majesty then presented the following prizes:—

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President of the College. In 1827 he was elected a Fellow of the Royal Society. Guthrie was not only a brilliant surgeon and a gifted teacher, but he possessed an original mind well suited to research as shown by the large number and variety of his clinical papers. He died in 1856. The award was instituted in recognition of his outstanding contribution to the work of the Army Medical Services and its first recipient is:—

SIR STANFORD CADE, K.B.E., C.B., F.R.C.S., F.R.C.P., F.R.C.O.G., D.Sc., F.F.R., F.A.C.S.

THE PARKES MEMORIAL PRIZE

Instituted in memory of Doctor Edmund Alexander Parkes, M.D., F.R.C.P., F.R.S., an assistant surgeon in the 84th (York & Lancaster) Regiment, who retired from the Service to become the first Professor of Hygiene from 1860 to 1875. It is awarded annually to the regular serving officer of the Royal Navy or Army, who, in the opinion of the Committee, has done most by professional work of outstanding merit to promote the study of Naval or Military Hygiene.

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THE KATHERINE WEBB PRIZE

Mrs. Eglantine Katherine Webb, the widow of Surgeon-General Sir William Marshall Webb, who joined the Services in 1854 and died in Cairo in 1899, left a charitable legacy to found the "Katherine Webb Memorial Fund." The prize is awarded to the officer who comes first in Medicine, Tropical Medicine and Entomology.

1959 MAJOR D. KELLEHER, M.B., B.Ch., M.R.C.P. (Edin.), D.T.M. & H.

THE PARKES PRIZE is awarded to the officer who comes first in Army Health.

1959 MAJOR D. KELLEHER, M.B., B.Ch., M.R.C.P. (Edin.), D.T.M. & H.

1960 MAJOR N. NAWAZ KHAN, M.B., B.S., D.T.M. & H.

THE MONTEFIORE PRIZES

Presented in 1681 by Mr. Nathanial Montefiore, F.R.C.S., for the encouragement of Military Surgery, and now awarded for the highest and second highest marks in Military Surgery.

1960 MAJOR W. P. MACLAY, M.B., Ch.B., D.T.M. & H.

COLLEGE PRIZES-JUNIOR OFFICERS' COURSE

(Three Courses each year)

THE SIDNEY HERBERT PRIZE

Instituted in memory of Lord Herbert of Lea, who as Secretary of State for War was responsible for the creation of the Army Medical School. The prize is awarded to the officer who has obtained the highest aggregate of marks in all the subjects of the examination.

CAPTAIN D. M. ROBERTS, M.B., B.S.

CAPTAIN J. F. IFFLAND, M.B., B.S.

CAPTAIN A. J. SALTER, M.B., B.S., D.T.M. & H.

THE MONTEFIORE PRIZES awarded as for the Senior Officers' Course.

- (1) CAPTAIN W. C. MOFFAT, M.B., Ch.B., D.T.M. & H.
- (2) CAPTAIN D. I. MACNAIR, M.B., B.S., D.A.
- (1) CAPTAIN J. S. BAILEY, M.B., B.Ch., D.T.M. & H.
- (2) CAPTAIN W. R. O. EGGINGTON, M.B., B.S., M.R.C.S., L.R.C.P., D.T.M. & H.



THE PARKES PRIZE awarded to the officer who comes first in Army Health.

CAPTAIN R. S. BLEWETT, M.B., B.S., D.T.M. & H.

CAPTAIN W. C. MOFFAT, M.B., Ch.B., D.T.M. & H.

CAPTAIN A. J. SALTER, M.B. B.S., D.T.M. & H.

THE DE CHAUMONT PRIZE

Endowed by Mrs. de Chaumont in July, 1891, in memory of her husband Surgeon-Major F. S. B. F. de Chaumont, M.D., F.R.C.S., F.R.S., formerly Professor of Hygiene at the Army Medical School, and awarded to the officer who obtains second highest marks in Army Health.

CAPTAIN D. M. ROBERTS, M.B., B.S.

CAPTAIN J. F. IFFLAND, M.B., B.S.

LIEUTENANT M. R. BAYLIS, M.B., B.S., D.T.M. & H.

THE RANALD MARTIN PRIZE

Established by public subscription to commemorate the late Sir James Ranald Martin, Kt., C.B., F.R.C.S., F.R.S., Physician to the Secretary of State for India and a member of the original Senate of the Army Medical School of Fort Pitt, Chatham, and awarded to the officer who obtains highest marks in Tropical Medicine.

CAPTAIN H. PULLEN, M.B., Ch.B., D.T.M. & H.

CAPTAIN J. F. IFFLAND, M.B., B.S.

CAPTAIN J. S. BAILEY, M.B., B.Ch., D.T.M. & H.

THE TULLOCH MEMORIAL PRIZE

Founded in 1908 by the Royal Army Medical Corps Fund in memory of Lieutenant F. M. G. Tulloch, R.A.M.C., who died in The Queen Alexandra Military Hospital, Millbank, on 20th June, 1906, of sleeping sickness contracted in the investigation of that disease in Uganda, 1904-1906. It is awarded to the officer who obtains highest marks in Pathology.

CAPTAIN R. F. KNIGHT, M.B., B.S., D.A., D.T.M. & H.

CAPTAIN W. C. MOFFAT, M.B., Ch.B., D.T.M. & H.

CAPTAIN A. J. SALTER, M.B., B.S., D.T.M. & H.

After the presentation of prizes there came an important announcement by the President of the Royal College of Surgeons. His Council, realizing the importance of the teaching of Military Surgery and the need for more integration between army medical officers and the civil profession, had welcomed a recent approach by the War Office to the Royal College of Surgeons. A committee had been appointed to enquire how best the Professorship of Military Surgery of the Royal Army Medical College might be brought under the ægis of his College. The closer association projected would enable joint research work to increase considerably. While such work is primarily concerned with wounded and injured under war conditions, its application to peace-time requirements, for example the care of traffic accidents, might far outweigh its war-time scope.

In her address, Her Majesty congratulated the prize winners on their hard work and academic successes. She expressed her great pleasure at the announcement made by Sir Arthur Porritt, the President of the Royal College of Surgeons. She looked back upon the College's achievements in the past century and its progress to its present position as a post-graduate centre to which come members of the Army Medical Services of our friends, our allies, and the Commonwealth countries.

The Director General then thanked Her Majesty, not only for her gracious presence at the Centenary Celebrations, but also for her constant interest in the medical work of the Army. He paid honour to the achievements of men such as Bruce, Firth, Logan, Leishman, Fraser, Tulloch, Megaw and Sinton, who had worked in the laboratories of the College and who had spent most of their lives, some indeed giving their lives, fighting diseases such as sleeping sickness, malaria, brucellosis, smallpox and typhoid, to free millions of the inhabitants of the countries in which they served from disease and suffering. Today students from these very countries come to study in the College. We are proud that their training is being entrusted to us. The circle is complete and we go forward together.

Leaving the theatre, Her Majesty visited the Army Health Laboratory and the College Library, took tea in the Mess and then came to the Ante-Room. Her Majesty wore a dress of attractive, deep cornflower-blue with a matching feathered hat, a mink cape, a diamond brooch and three rows of pearls held by a large ruby and diamond clasp. After a long stay, chatting freely with the many visitors who were presented by the Director General, Her Majesty visited the V.C. Room and finally departed to a fanfare of trumpets.

Many impressions remain after this unforgettable day, in particular the grace and charm of our Colonel-in-Chief, the excellent bearing of the Guard of Honour in spite of pouring rain, and the boundless energy of our Director General who conceived this great occasion and brought it to reality.

The following letter was received by the Director General, Army Medical Services.

CLARENCE HOUSE, S.W.1. 31st October, 1960.

My dear General,

I am commanded by Queen Elizabeth the Queen Mother to write and tell you how much Her Majesty enjoyed her visit to the Royal Army Medical College last week.

It was a proud day in the history of the College, and Queen Elizabeth felt that the form of ceremony and celebrations exactly fitted the occasion.

Her Majesty was delighted to have the opportunity to meet so many members of her Corps during her visit, and Queen Elizabeth would be grateful if you would convey her appreciation to all who contributed to the success of this memorable and enjoyable afternoon.

Yours sincerely,

WILLIAM RICHARDSON,

Equerry to Queen Elizabeth
The Queen Mother



THE PERFECT AUNT—F.N. 1820-1910

From an address given in All Saints' Church, Middle Claydon, on Sunday, 14th August, 1960.

Sir HARRY VERNEY, Bt.

[Sir Harry is the head of a family in which Florence Nightingale spent much of her life; he is probably the only man who can recall her, and was perhaps her favourite great-nephew. This talk was for a congregation mainly of nurses; its charmingly personal view, heightened by the vivid remembrance of childhood, brings her strongly to life. ED.]

FLORENCE Nightingale was born on 12th May, 1820, and died on the 13th August. 1910. To quote a Harrow song, she died "Yesterday-many years ago." There is a wonderful biography of her by Mrs. Woodham-Smith: I should like to quote it all, but as it is rather long I will only tell you the first sentence. "It was something new to call a girl Florence." By the end of last century hundreds were so called, but hardly any since 1910. So if you meet one you can tell her (though don't say I said so) that she is over fifty. Miss Nightingale was, of course, called Florence because she was born at Florence. Her mother was a society beauty much loved and admired. She was constantly at Claydon visiting her daughters, but before my time. My mother told me that towards the end of her life Mrs. Nightingale lost her memory, and once at Claydon with a large party she thought she was in her own house and apologized to the other guests for the badness of the food. Miss Nightingale's father was richbanking and beer, still good enough for making money—immensely clever but aloof and detesting family squabbles. Her elder sister, Parthenope, from early days was possessive as regards Florence, as well as being jealous and hysterical; she was not nearly as nice looking as F.N.—rumour has it that they were known as The Pretty Miss Nightingale and The Other Miss Nightingale. The home was never a happy one for Florence. Little girls in the 1820's did not go to school, and all education was given by papa. He taught them Latin and Greek, French and German, mathematics and statistics, Latin Hexameters and Greek lambics. I have a feeling that not all of us would have passed with flying colours in Hexameters and lambics; we might have known as much as Parthenope, which was nothing at all. She just would not be bothered. Of what use were they in Society? But Florence lapped it all up and became a considerable Greek scholar, fit to argue with Benjamin Jowett, the Master of Balliol. So Parthé (as everybody called her except me; I did not dare) grew up not too well equipped intellectually.

Then at the age of sixteen, on 7th February, 1837, Florence had a call from God—the still, small voice that Elijah heard. She had no-one she cared to confide in, so she kept voluminous diaries and wrote innumerable letters, all beautifully written and dated. In 1837 women were not treated with much respect and the nurses in particular were mostly drunken sluts. It was in that year that Lord Melbourne said, "I would rather have men about me when I am ill; I think it requires very strong health to put up with women." So F.N. devoted herself to work, work, work. Her rich family

travelled in England and abroad. The three elders visited old churches and called on Ambassadors. Florence went straight for hospitals and became *the* authority on them in Europe.

Then came the Crimea with the awful misery among sick and wounded. "Whom shall we send?" wrote Sidney Herbert; "Here am 1; send me," wrote F.N. in letters that crossed in the post. The Crimean details are in every book, but she was the one and only one who left the Crimea with enhanced reputation. As well as bringing order out of chaos she was always available when wanted, day or night. A dangerous operation: fetch F.N. A man dying: would F.N. stay with him to the end. The soldiers worshipped her and soon found the anagram on Florence Nightingale, "Flit on cheering angel." The story of her return home is less well known. She would not move from Scutari until every soldier, sick or wounded, had left. The War Office said they would send a warship to bring her home: "No thank you." Then the massed bands of the Guards shall play you on shore at Dover: "No thank you." She came home as Miss Smith, using her mother's name; she stayed a night in Paris with a friend; she crossed by night to Dover; in London she called on her old friend the Reverend Mother at Bermondsey; she caught as it might be the 2.26 p.m. from St. Pancras; she walked up from the station to Lea Hurst and an old retainer, Mrs. Watson, looking out of window said, "Why! there is Miss Florence." There were no photos of her; she had gone out at thirty-four and come home thirty-six.

And why did she never marry? She had countless suitors. Here are four: Richard Monckton Milnes, afterwards Lord Houghton; Benjamin Jowett of Balliol—they were content to study Greek together; a publisher whose well known name shall remain unrecorded—he wrote to Mr. Nightingale enclosing a letter not to be delivered if there was no hope (it was not delivered and I have it by me): and my grandfather and namesake, Sir Harry Verney, who having been refused, married sister Parthé in 1858. In 1881 I appeared on the scene and was christened in Middle Claydon Church by the Dean of Ripon; but that is only hearsay; I do not remember it. I suppose I began to take notice about the time of Queen Victoria's Jubilee in 1887. It must have been about then that F.N. became to me a Guardian Angel. Claydon was not an easy place for a child to live in. The huge nursery seemed about the size of the Albert Hall. But the real problem was four old people, two nice and two nasty. Of course they were not nasty in fact, but I thought they were.

Most frightening of all was Great Uncle Frederick, brother of Grandpapa; he was fierce and very rich and childless. Children were to be seen and not heard; gladly we agreed, if only we need not be seen: but twice a day there was the inevitable kiss. After breakfast we had mustard or egg from his lips; by the evening his beard was hard on our tender cheeks ("our" included my sister Ruth); but worse, there was generally a drop from his nose which had to be kissed away. I claimed Ladies First, but my sister objecting, we took alternate days. He seemed to us an ogre who would certainly have gobbled us up, but for F.N. of whom he was afraid. The last time I saw him was at a memorable lunch when he was going "funny" and helped himself to potatoes, eating them out of the dish to the embarrassment of a footman. Later when my mother taught me the Book of Daniel I wondered whether, like Nebuchadnezzar, Uncle Frederick took to eating grass in the park. The other "nasty"

was Parthé; she had arthritis, was always cross, poor dear, and disliked children: couldn't we go away? Of course we could, but it was she who went away. During my first term at Wixenford with my delightful elder cousin Ralph, a telegram came. I thought, "What a relief," but seeing Ralph was sobbing I thought I had better sob too, though I do not think either of us minded much. How unfair we were. Among the "nice" came Grandpapa; a lovely person full of fun, athletic and holy and loving children. He lived to be 92 and died on a Monday, 12th February; he was riding the Tuesday before. On his monument we put "Such as are gentle them shall he learn his way." Each year I remember the date.

The other "nice" was F.N. She was the perfect aunt. One saw her constantly. She was much at Claydon after 1874 when her father died, for her two homes were entailed on the male heir, and she had no brother. When privileged to see her as a tiny boy one took a flower or a feather; she always knew what bird it belonged to. Then later a book or a youthful problem; she always knew, for she was vastly clever and understanding. Parthé died in 1890, and F.N. came more and more to Claydon. About this time I had two letters from her. One concerned a Tom Tit:

"My Dear Harry... A Thomas Tit, rather smaller than an under-sized walnut, comes to my windows for his luncheon, dinner and tea, but says he can find nothing which suits his digestion (which he is obliged to be very careful of). And he requests that a mutton bone with a good deal of nutriment on it, should be hung up for his special refreshment.

Ever, your loving Aunt Florence."

So off I went with my letter to the kitchen and procured and hung up the required bone. Here is the inscription on the first page of a diary for 1895, the year I went to Harrow:

"For our dear Harry with Aunt Florence's love and may each day of this New Year 1895 be better and happier than yesterday, and may the young boy and the old woman make and find this a better and a happier year than any that has gone before.

So help us God. New Year's Day, 1895."

With the new century I went to her beloved Balliol; but gradually she began to fail, first eyes and then memory. The end came in 1910. I was at Dunphail in Morayshire and I received a telegram with alarm; I was busy courting a young lady and thought that if I went south to the funeral, some one else might have found my pearl and run off with her. I need not have worried, and we have been happily married for close on 49 years. There was a vastly attended Memorial Service in St. Paul's. I went to the funeral at Wellow to represent our part of the family; there were perhaps a dozen of us, Mr. and Mrs Vaughan Nash, Mr. Shore Nightingale, four Guardsmen to carry the coffin, a few nurses and myself. On her grave was F.N. 1820 to 1910. There was no other memorial. What! no memorial? Look at the fourteenth Chapter of St. Mark's Gospel and the ninth verse: "What she has done will be spoken of throughout the whole world." She was so kind and generous, particularly to those in trouble and particularly to Nurses. It was her personality that dominated—her strength and courage, her love unending, her immensely high standards of work and conduct. She was a Saint.



FLORENCE NIGHTINGALE

From an original miniature Water Colour kindly loaned by The Royal College of Nursing Library



Inspector General W. C. MACLEAN

Professor of Military Medicine, Royal Army Medical College

1860 — 1886

DEPARTMENT OF TROPICAL MEDICINE

Colonel R. J. G. MORRISON C.B.E., M.D., F.R.C.P.

Professor in Tropical Medicine and Consulting Physician

THE history of the Department of Tropical Medicine is so intimately bound up with the first Professor of Military Medicine that some account of his life and times forms an essential background. William Campbell Maclean served as Professor from 1861 until he retired some 25 years later. His influence on his students, and on the teaching of Tropical Medicine in general, was immense. During his tenure of office 1,476 medical officers of the British Army, the Royal Navy, and the Medical Service of the Government of India attended his classes, and during this period the mortality rate of the Army in India dropped from 69 to 13 per thousand. Maclean's appearance should be well known to all R.A.M.C. officers. His portrait hangs in the Smoking Room of the Headquarter Mess an honour he shares with his beloved teaching colleagues Parkes, Longmore and Aitken. From his position above the letter-rack Maclean surveys the present students with an air of serene dignity tinged with autumnal melancholy. He was born in 1811 in Scotland. Both sides of his family were of Highland stock. The Macleans had had military associations for many years. The Clan Maclean had been "out" for the Stuarts in the rebellion of '45, and some of the family, probably his father's uncles, were forced to flee to America after Culloden. Maclean's father, John Maclean, was descended from Neil Ban "the fair" who was the second son of Donald, the first Maclean of Ardgour. Neil Ban obtained the lands of Boreray in North Uist and these remained in the family for more than 300 years. Early in the 19th century Maclean's father left his ancestral hearth and purchased the estate of Drimmin in Morvern, on the Sound of Mull. Maclean's wife was the daughter of Donald Macleod of Bernera. Donald possessed a virility seldom excelled in these days of pallid temperaments. He married at the age of eighteen. By the time his wife died she had presented him with twenty children. He lived with his second wife for nineteen years before she died without issue. But his fires were not damped. At the age of seventy-five he took as his third wife Margaret, a girl of sixteen, and had nine children by her!

During the early days of his life Maclean was saturated with military atmosphere. Indeed, he derived his Christian names from William Campbell of Ainsay, the Colonel of the 78th Highlanders, who had been a great friend of the family and was killed in action at the capture of Java in the year Maclean was born. Maclean was four years old at the time of Waterloo, but it is doubtful if he had any recollections of it. It is, however, quite certain that he knew many men who had served under Wellington and that he listened to their tales of adventure. The Highlands in those days were swarming with half-pay officers who had fought with Highland regiments in Spain, Holland and Belgium. Maclean's father offered hospitality to them, and on frequent occasions his sons heard the talk of the mess-table, which was, as often as not, con-

ducted in Gaelic. In his early childhood Maclean was considered a delicate child and for a while suffered from blindness. His autobiography recalls an incident when at a tender age he was enlivening the bleakness of a Highland Sabbath by playing a fiddle. He was surprised in this by the sudden appearance of Dr. Hill, the Principal of St. Andrew's University. Maclean neatly deflected the wrath to come by asking if God would "be angry with a poor blind boy for playing the fiddle on a Sunday?" The good doctor was so affected that he turned his head aside and wept. Whatever may have been the nature of his blindness, Maclean's recovery of his vision was complete and he continued to have exceptionally good eyesight up to his eighty-fourth year. In the year 1818 the Maclean family moved to Stockbridge and in this year a series of misfortunes occurred. In the first place his father's health declined. He had for long been troubled with the stone and the time had now come when facing the surgeon's knife held fewer terrors than the illness. The operation was performed by Mr. George Bell, the Edinburgh surgeon. It lasted one hour and was bravely borne. It was not a success and the old gentleman was taken by sea to London where Sir Astley Cooper performed a further operation which relieved his distress until he finally succumbed to renewed symptoms a few years later. At this time, too, the family's finances were becoming strained. In 1824 Maclean and his brother Roderick were sent to school at the Dollar Academy in Clackmannanshire. He boarded with a Mr. Bell, the mathematics master, who neglected him completely, being most of the time "with his head in a creel" deeply absorbed in some mathematical problem. His health gradually improved. The sick headaches from which he had long suffered disappeared. His morale and his reputation in the school were considerably fortified by his administering a boxing lesson to the school bully—Tammy Scotland, with whom a fight had been arranged for him.

In 1829 Maclean began the study of Medicine at the University of Edinburgh. Life at once became an intensely exciting affair. His interest was stimulated by a new aspect of society. Edinburgh was then at the height of its fame as a seat of learning. The great Dr. Knox was Professor of Anatomy. He was, however, not destined to remain on his pedestal for long. The trial of Burke and Hare, the murdering "resurrectionists," revealed that Dr. Knox did not inquire too deeply into the source of his bodies for the dissecting room. His good name was blasted. His influence declined and although he stood his ground for some years he had eventually to leave for England where he eked out a living as an occasional lecturer. He eventually died in poverty. Maclean always held that Knox was hard done by, the real fault lying with his subordinates who misinformed him about the origins of the subjects. Another stimulating personality was Professor Sharpey, the Secretary of the Royal Society. The Professor of Medicine, Dr. Home, had the unenviable reputation among the students of being forty years out of date. Apart from medical men, other noted men of learning were out and about in Edinburgh at that time. Maclean would often catch sight of Sir Walter Scott as he limped home of an evening, from his duties as Clerk of the Courts of Sessions to his house in Castle Street. Then there was Ballantyne the famous printer, at whose house Maclean attended on many a musical evening. These were the days of Allison the physiologist, Professor Monro, the grandson of the discoverer of the foramen of that name, and Playfair the architect who had an important part to play in the design of the New Town of Edinburgh. Maclean met and knew all these people and their influence must have touched him.

In due course Maclean qualified, becoming a Licentiate of the Royal College of Surgeons in 1832. After a short holiday in the Highlands he returned to Edinburgh to work for his M.D. degree, which he obtained in 1834. Maclean started his career at the age of 23 as a ship's surgeon, making two voyages in this capacity. The first was in the *Upton Castle* proceeding to the Bombay Presidency. To join the ship was Maclean's first journey of any length, and certainly a varied one. He went from Glasgow to Liverpool by sea. At Liverpool a great excitement awaited himthe prospect of the journey from Liverpool to Manchester by train. This was the first railway to run in England, and the only one then in operation. From Manchester he took the crack coach *Peveril of the Peak* and had an exhilarating run down to London. He found the *Upton Castle* to be a well founded ship; a transport carrying the future Commander-in-Chief, Sir John Keen, and crowded to capacity with officers to whom Maclean took an immediate dislike and with whom he had little in common. This may explain an occasion which Maclean records with relish in his autobiography. It appears that a young Bombay officer was his partner at a game of whist. It was Maclean's turn to deal the cards, but the violent action of the ship caused a misdeal. Whereat his partner "made a foolish observation together with an impudent gesture" which brought Maclean's Highland blood to the boil. He told his partner "not to twist his moustache" at him. Further offence was taken. Tempers mounted. Finally his partner hotly issued a challenge which was at once accepted. It was arranged that on the ship's arrival at Bombay a duel should immediately be fought. A site called Phipp's Grove had been set aside for such meetings. When the parties arrived at the duelling ground and faced each other, each fired with deliberate intent to miss. Whereupon they were both overcome with laughter and retired to the Bombay officer's lodgings for a convivial celebration of their renewed friendship. Maclean's mature reflection upon this incident is that he was appalled that none of the senior officers on board, who were fully aware of the circumstances, made any attempt to affect a reconciliation but were quite content to allow the affair to proceed to its ridiculous, but dangerous, conclusion.

Maclean's second sea voyage was to China. He called at Macao and on the return journey at St. Helena, where he saw Napoleon's grave under the willow tree where he was buried before being removed to the Invalides. It was shortly after his return from this voyage, in 1836, that Maclean had his first contact with the Army Medical Department. His uncle, Sir John Macleod, wrote to the Director General, Sir James McGrigor, offering the services of his nephew. Sir James replied offering the appointment of Surgeon to the Gold Coast which was politely declined. Instead, Maclean took a holiday in Paris and did the rounds of the famous teaching hospitals. In 1838, at the age of 27, he obtained an appointment as Assistant-Surgeon in the Madras Army. This was the start of that period in his life when practically everything he did in some way influenced his later teaching at the Army Medical College. These were the years from 1838-1860 when Maclean was actively engaged in diagnosing and treating tropical diseases, experience which formed the basis for his teaching days. The lessons he learned made vivid impressions and were not easily

forgotten. In those days, service in the tropics was very different from modern times. Medical officers had no power and little influence. Any officer commanding a regiment could, and very often did, flout medical advice with impunity. Maclean found that the only way of ensuring that his advice on matters of army health was followed was to make his views known to those in high authority. The soldiers were coarse and cruel, often the sweepings of the prisons. Floggings were still common. Maclean was foremost in condemnation of such treatment. He described a case in which a soldier died with extensive lacerations of the back from 150 strokes. Drunkenness was rife. It is notable that Maclean would often give a homily to the officers and men on the evils of strong drink, a theme that recurs frequently in his autobiography. Sanitation was primitive and dysentery common. Not infrequently cholera broke out on the transports. On arrival at Madras Maclean spent two months on probationary duty at the General Hospital. One aspect of his service had much in common with modern times—the frequency with which a young unmarried officer receives a change of posting! In 1840 the Opium War with China broke out. Maclean volunteered for service in China and for the next three years was engaged in active fighting. He took part in the occupation of the Island of Chusan. He considered the operation as one of the most disgraceful episodes of our military history. The force was led by an incompetent commander. The meat, which had been salted in Bombay, was foul. The commander would not allow it to be condemned, but to save the expense of replacement insisted on its being issued to the troops. A severe form of "scorbutic dysentery" resulted. The 26th Cameronians lost 82 men in a few days. When the island was taken, further health troubles arose. The soldiers were poorly quartered. They had unsavoury billets, mostly in joss-houses in the centre of the town. Dysentery continued to take its toll. Maclean found ipecacuanha an effective remedy. There was also heat stroke to be treated. Maclean early noticed how this disease was easily confused with apoplexy and noted the differences between them. Cholera broke out from time to time and was always in the offing.

In 1843 Maclean was posted back to Madras and after a short time was sent as Residency Surgeon to the Court of Hyderabad, Deccan. This was an important position. Maclean regarded it as the turning point in his life. Here he was to all intents and purposes a busy civilian practitioner fulfilling the duties of what was later to be known as a Civil Surgeon of the Indian Medical Service. It was an ideal posting with an attractive house and garden and an income of about £1,000 a year. He was his own master, being responsible only to the Resident. His duties were interesting and pleasant. He had charge of the general hospital which was within the walled city of Hyderabad. The Nizam at this time ruled over the city. Maclean found him to be fat, ignorant and lazy. He was aloof and unhelpful to the British and enjoyed creating difficulties. Towards Maclean, however, he relented. He was the only European to be allowed access to the city at all times without a special pass. His duties embraced every branch of medicine and on many occasions he was required to stitch wounds or mend bones broken in the warfare between rival bands of merchants.

Under the genial influence of his happy domestic state Maclean, after one year's residence at Hyderabad, married Miss Louisa Macpherson, a niece of his brother-

in-law, General Duncan Macpherson. It was soon after this that there came another event to prepare him for his future professional appointment. The Resident had long been anxious to start a Medical School at Hyderabad to build a body of local doctors. The Nizam and the Governor General acquiesced in the project, appointing Maclean as superintendent of this school. This involved a great deal of extra labour and Maclean found himself teaching, in the vernacular, for nine hours a day except in the extremely bad weather of March, April and May. However, the job brought in an extra £500 a year, welcome with his family beginning to increase.

Maclean laboured happily at Hyderabad for the next twelve years until in 1855 he went home on leave. He returned in 1857, having decided to leave his family in England. Breaking his journey at Ceylon he found that the Indian papers gave a rumbling warning of the Sepoy Mutiny which was to break out soon. When he arrived in India it was in full swing. He was posted as Garrison Surgeon at Visagapatam. Life now was very different from the old position. He was quartered next to the native regiment, whose loyalty was under considerable suspicion. Every post brought sacks of letters to the Sepoys urging them to turn on their officers and join their comrades in mutiny. Maclean and his brother officers were subjected to considerable tension. They slept every night with loaded revolvers under their pillows. It must have been with immense relief that one day the news trickled through of the fall of Delhi. The back of the mutiny had been broken. Shortly afterwards came further good news. Maclean received a letter from Mr. Sidney Herbert, then Secretary for War, offering him the chair of Medicine in the Army Medical School, then in the process of foundation.

Maclean, now aged 49, hastened home to England only to find that his job was now in jeopardy. The War Minister had decided that the appointment was to be for five years in the first place. This did not suit Maclean for it was an Indian Office rule that any officer who had left the service for more than five years was not eligible for re-employment. If Maclean's contract was not to be renewed at the end of five years he would find himself high and dry without employment just at a time when his children were approaching an expensive age. He asked for and obtained an interview with Mr. Herbert. He found him, as had so many other people, charming, courteous, exquisitely mannered—but unshifting in his opinion. But there was another mind fighting on behalf of Maclean—a mind more determined, more inflexible, indomitably fixed on the attainment of its own purpose: the mind of Miss Florence Nightingale. She was in daily communication with Maclean and quite determined that he was to be the first professor. Through her influence Sir Charles Wood, Secretary of State for India, agreed to re-instate Maclean if he should prove unsatisfactory after a probationary period of two years. This was fine and Maclean was accordingly firmly in the chair. The Director General of the Army Medical Department, Sir James Gibson, at the end of the two years made a bid to return to the fiveyear appointment, but Maclean was immediately up in protest—the professor should be appointed for life or until found unsuitable. A committee was appointed by the Secretary for War to pontificate over the wrangle. They found in favour of Maclean.

From its very inception Tropical Medicine played a very important part in the curriculum of the College. It is true that Maclean's official title was Professor of

Military, not Tropical, Medicine, but his charge was "to describe and clinically demonstrate those diseases most commonly met with in the Army, their prevention and treatment, more especially infective and epidemic diseases encountered and acquired in Tropical and Sub-Tropical countries." Maclean divided his teaching into two parts. There were set lectures of a formal character, and demonstrations and clinical rounds at the Royal Victoria Hospital at Netley. Netley was then largely an evacuation hospital, more than three quarters filled with soldiers evacuated from Students at the College were allocated patients and, under the assistant professor, responsible for them. The subject matter of the lectures has been preserved for posterity. In 1886 Maclean published his lectures in book form, Disease of Tropical Climates. This makes interesting reading, especially with respect to malaria. Laveran had very recently described the malarial parasite. Maclean remarks: "Should future observations by independent observers in other malarial regions confirm these conclusions, it would be difficult to overrate their importance." Remittent and intermittent fever are separately described. Other subjects were enteric fever, relapsing fever, dengue, yellow fever, dysentery, cholera, beri-beri-indeed the subject matter has not changed a great deal since early times. Maclean kept up a lively correspondence with his old pupils after they proceeded to the Tropics. Frequently his lectures are graced by some little anecdote told him by one of his past students and used by him to illustrate a point. Maclean's long period as professor lasted until he was 74. The Proceedings of the Senate Meetings towards the latter years of his term are punctuated by periodic appeals from Maclean to be released from his duties due to "private and personal matters", but always he was prevailed on to remain.

Maclean was much loved and respected. In addition to his lectures he published sections on Tropical Medicine in Russell Reynold's System of Medicine, and Richard Quain's Dictionary of Medicine, besides sundry articles and papers. He was made a Companion of the Most Honourable Order of the Bath, and Her Majesty Queen Victoria appointed him her Honorary Surgeon. The University of Glasgow gave him the Degree of Doctor of Laws. On his retirement he lived happily at Clifton and died in 1898 at the age of eighty-seven. He was succeeded by Dr. D. B. Smith, who had served in India, but he was not to enjoy the chair for long. Soon after taking up office he developed a deep seated cerebral tumour from which he died.

The teaching of Tropical Medicine has continued from these early days. Maclean's zeal and industry, his kindly interest in his students, his genuine desire to further the study of Tropical Medicine did much to set his department on a successful path. The fact that his courses have needed little modification over the years says much for the wisdom and foresight of their originator. Perhaps the greatest innovation has been the addition of a new discipline, entomology. This was introduced by another remarkable man who held the chair for seven years, Lieut.-General Sir William MacArthur. As knowledge grew of the role of insect vectors, Medical Entomology became more closely wedded to Tropical Medicine. Sir William was quick to realize the importance of entomology, and on his appointment in 1922 the subject was included in the syllabus and gradually extended until it occupied its present position of importance. Sir William is a remarkable man. He has achieved distinction

in three fields. As a lecturer he is quite without equal. His subject matter is learned by heart. His sentences are hammered and turned until they are perfect. They are delivered with poise and grace. Every word can be heard. Each phrase has its deserved emphasis. There are no embarrassing pauses, no throat clearings, no furtive glances at notes, no hesitations. A lecture by him belongs to the same order of things as a Dickens reading by Emlyn Williams or a Shakespearian monologue by Gielgud. In the field of medical research the name MacArthur will be linked with the discovery of cysticercosis and its importance to the Army. But it is as a scholar, pure and simple, that most people will surely remember him; the classics and the study of the Gaelic language are the subjects which lie closest to his heart. His three special talents—oratory, tropical medicine and the classics—were fused on the occasion of his Presidential address to the Royal Society of Tropical Medicine, in which he identified as typhus the Athenian Plague of 430 B.C., so graphically described by Thucydides.

Entomology needed but one more advance to bring it to its present status. This was achieved by Major-General W. R. M. Drew during his term as professor, when he found and appointed the right man to be wholetime Entomologist to the College, Mr. J. H. Grundy. Recently the College has extended the scope of its teaching. Apart from helping to prepare candidates for membership of the Royal College of Physicians, special courses have been given for the D.T.M. & H. examination. The Director General has taken a personal interest in this matter and under his urgent stimulus nearly every member of the Senior and Junior courses has sat for the examination. It is a happy thought, which augurs well for the future of the College, that so far, out of 50 candidates who have presented themselves, 43 have been successful.

PROFESSORS OF TROPICAL MEDICINE ROYAL ARMY MEDICAL COLLEGE

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INSPECTOR GENERAL W. C. MACLEAN.
1860-1886
1887-1889
           SURGEON MAJOR D. B. SMITH.
1890-1897
           BRIGADE SURGEON H. CAYLEY.
1898-1905
           COLONEL K. McLEOD.
1906-1909
            MAJOR R. J. SIMPSON.
1910-1913
           MAJOR W. S. HARRISON.
            LIEUT.-COLONEL O. L. ROBINSON.
1914
1915-1918
           No appointment.
1919-1920
           LIEUT.-COLONEL O. L. ROBINSON.
1920-1921
           COLONEL J. C. KENNEDY.
COLONEL W. P. MACARTHUR.
1922-1929
1930-1934
           COLONEL J. HEATLEY SPENCER.
1935-1938
            LIEUT.-COLONEL A. G. BIGGAM.
1939-1940
           LIEUT.-COLONEL S. SMITH.
           LIEUT.-COLONEL T. MENZIES.
LIEUT.-COLONEL W. R. M. DREW.
1941-1942
1943-1946
1947-1948
            BRIGADIER S. SMITH.
1948-1952
           LIEUT.-COLONEL A. N. T. MENECES.
1953-1956
           COLONEL W. R. M. DREW. COLONEL W. D. HUGHES.
1956-1957
1957-1959
           COLONEL J. A. G. CARMICHAEL.
            COLONEL R. J. G. MORRISON.
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Note: The title of Professor of Tropical Medicine has not always been used for the Head of the Department. For example the Director of Medicine at the War Office used to be styled "Consulting Physician to the War Office and Professor of Tropical Medicine" although he was not engaged in teaching duties at the College. In these circumstances the actual teaching was done by the "Assistant Professor of Tropical Medicine." This title was re-instated in 1952 when a second instructor in Tropical Medicine was posted to the College. In other periods the Head of the Department was designated "Reader in Tropical Medicine." The above list refers only to those who were the Head of the Department and actually engaged in teaching.

DEPARTMENT OF PATHOLOGY

Brigadier L. R. S. MACFARLANE O.B.E., M.A., M.D., D.P.H.

Professor of Pathology and Consulting Pathologist

In 1855 Lord Panmure, then Secretary for War, instructed a young Irish doctor. R. D. Lyons, to proceed to Scutari to "make pathological researches in the hospitals attached to the Army in the East." This letter, a facsimile of which can be seen in the Pathology Department of the Royal Army Medical College, may well be called the Charter of Army Pathologists. It foreshadowed the formation of the first Practical Army Medical School at Fort Pitt, Chatham, in 1860, for one of Doctor Lyons's assistants was William Aitken (later Sir William), who became the first Professor of Pathology at the Army Medical School, a post he held for 32 years. He was succeeded in this post at the Army Medical School, then at Netley, by Dr. (later Sir) Almroth Wright and from this date dawned the golden age of Army Pathology. Here he developed his classic work on the anti-typhoid vaccine; his first trials were on himself and his colleagues, two of whom were Leishman and Bruce. Bruce was assistant professor at Netley, but his famous discoveries and work in connection with Malta fever and trypanosomiasis were carried out before and after this period at Netley and do not strictly belong to a dissertation on the Army Medical College. Later he was to become commandant of the College during the Great War and. although then officially an administrator, he flung himself into supervising research on trench fever and typhus.

At Millbank the first Professor of Pathology of the new College was Colonel (later Lieut.-General) Sir William Leishman. Here he perfected his work on kala azar, begun at Netley and studied with the aid of the new Romanowsky stain which he perfected. He carried out in the College further studies on the anti-typhoid vaccine. He was assisted by Major (later Colonel) Lyle Cummins who was in charge of the Vaccine Department and who later held the Professorship of Pathology at the College for a short period at the beginning of and for three years after the first world war. When Lyle Cummins retired he was appointed Professor of Tuberculosis at the Welsh National School of Medicine, a post which he held till 1938. Between the wars research continued at the College and from it emerged such notable results as the development of tetanus prophylaxis by Major (later Brigadier Sir) John Boyd, whose work on bacillary dysentery in India was already famous, and the significant lack of immunity produced by all but highly virulent strains of enteric organisms in mice. described by Perry, Findlay and Bensted. During the second world war the Vaccine Department moved out of the College as the Emergency Vaccine Laboratory, later to settle in East Everleigh, Wiltshire, as The David Bruce Laboratories. The Army Blood Transfusion Service built up so energetically by Sir Lionel Whitby had its humble beginnings at the College.

The Pathology Department of the College at present consists of a Morbid Anatomy Department, including the Army Tumour Registry, a Serology Reference Laboratory.

a Bacteriology Laboratory and a Virus Reference Laboratory. There are also smaller departments of Hæmatology and Parasitology. The Tumour Registry was initiated in 1948 and maintains specimens and reports of all tumour and glandular tissue removed from service personnel and their dependants since that date. It is linked with a follow-up register of tumour cases maintained by the Professor of Army Surgery. The Serology Reference Laboratory is soon to be abolished, its work being done elsewhere, but the Virus Reference Laboratory, started in 1954, has been considerably enlarged and will in the very near future be able to deal with all viruses including the arthropod-borne series. All departments have recently been modernized and the Animal House which was completed in 1951 is one of the largest and best ventilated in England. The Pathology Museum which was damaged in the War was completely redecorated and rearranged in 1953.

In addition to diagnostic functions, the Pathology Department of the College teaches Officers and Other Ranks, the former as Specialists or on refresher courses and the latter as Laboratory Technicians. Largely as a result of teaching here, the Institute of Medical Laboratory Technology recognizes our Laboratory Technician Class II Examination as equivalent to their Intermediate Examination and our Laboratory Technician Class I Examination as equivalent to their Associateship. Demonstrations are given for various outside bodies and the classroom is used for holding external examinations such as the Diploma of Pathology and those of the Institute of Medical Laboratory Technology.

The department is recognized as a teaching centre for such qualifications as the Diploma of Pathology and the Diploma of Tropical Medicine & Hygiene. Students from the London School of Tropical Medicine & Hygiene come to the College for demonstrations twice a year and instruction for the Diploma of Tropical Medicine & Hygiene is given to Officers at the College.

With the advent of the virus age, we must inevitably turn our attentions in this direction, and whatever other research is carried out, such as the storage of blood by freezing, on new antiseptics, hand lotions, etc., that on viruses will most certainly have pride of place and the College will as ever be in the forefront of "things pathological" in a changing world. No description of the College would be complete without a list of Professors of Pathology.

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1860-1892 Professor: SIR WILLIAM AITKEN.
1892-1903 Professor: Dr. Almroth Wright.
1903-1914 Professor: LIEUT.-COLONEL SIR WILLIAM LEISHMAN.
1914
           Professor: Major S. L. Cummins.
1919-1921 Professor: COLONEL S. L. CUMMINS.
1921-1926
           Professor: LIEUT.-COLONEL H. M. J. PERRY.
1926-1930
           Professor: COLONEL A. C. H. GRAY.
1930-1934 Director and Professor: Colonel A. C. H. Gray.
1934-1941
           Director and Professor: MAJOR-GENERAL H. M. J. PERRY.
1941-1945
           Director and Professor: MAJOR-GENERAL L. T. POOLE, M.C.
1945-1946 Director and Professor: Brigadier J. S. K. Boyd.
1946-1949
          Director and Professor: BRIGADIER H. T. FINDLAY.
1951-1953 Director: Brigadier A. Sachs.
1951-1952 Professor: COLONEL A. M. PUGH.
1952-1960 Professor: Brigadier L. R. S. MacFarlant.
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DEPARTMENT OF MILITARY SURGERY

Colonel J. C. WATTS O.B.E., M.C., M.B., F.R.C.S.

Professor in Military Surgery and Consulting Surgeon

THE first professorship of military surgery was established at Edinburgh University on the 7th November, 1806, under a Commission from King George III. This Chair was founded as a result of the agitation raised by John Bell in 1798 when he was appalled by the condition of the wounded landed at Yarmouth, and advocated in a Memoir to Earl Spencer, then First Lord of the Admiralty, that a University Chair should be formed. John Thomson (1765-1846) had been appointed professor of Surgery of the Royal College of Surgeons of Edinburgh in 1804, because of the dissatisfaction felt by them that the University Chair of Surgery was combined with that of Anatomy. The University objected strongly to the founding of this outside professorship and were meditating means of stopping Mr. Thomson holding this extramural appointment when they received the King's Commission to elect John Thomson to the Chair of Military Surgery. Thomson held this appointment until 1821, and paid visits to the Continent in 1814 and 1815. During the latter, he studied the progress and treatment of the wounded after the Battle of Waterloo. His lectures on military surgery were well attended, his classes numbering about 280, of whom only 80 were officers of the Armed Forces. He was succeeded by Sir George Ballingall (1780-1855) and in 1829 the Royal College of Surgeons of Edinburgh permitted candidates for the Diploma to take the Course in Military Surgery in place of one of the two courses for surgery prescribed. On his death, the Chair of Military Surgery was abolished, but in the meantime a Chair of Military Surgery at Dublin had been founded in 1851, being held by Dr. Thomas Jolliffe Tufnell.

Deputy Inspector Thomas Longmore, the first professor of Military Surgery at Chatham, had had a distinguished career in the Army Medical Services since being gazetted to the 19th Regiment of Foot in February 1843 at the age of 28. He soon transferred to the cavalry and served with the Light Division in the Crimea, returning to England in 1856 to obtain the Fellowship of the Royal College of Surgeons, his skill as a surgeon having already attracted attention and commendation. He served in India from 1857 to 1859, returning to England to become professor of Military Surgery and to form the Department of Military Surgery at the Army Medical School at Fort Pitt, Chatham. He was promoted General in 1872 and retired in 1876, retaining the chair of Military Surgery until 1891. He was knighted by the Queen at Osborne in 1886. He was universally regarded as the doyen of military surgery and published a number of works, his chapter on Gunshot Wounds in Holmes's Textbook of Surgery being reprinted as an official pamphlet used by both Federal and Confederate Armies in the American War of Secession.

To understand the work of the Department, the development of Surgery in the past 100 years must be borne in mind. In pre-listerian times, surgery was limited in its scope, so the Professor of Surgery was able to combine the teaching of military

J. C. Watts 21

surgery with the surgical duties at the hospital at Netley. As the scope of surgery increased, so the role of the surgeon generally in the Army became more important and more specialized. After the first war this led to the need for a more expert and exact control over the distribution and appointment of surgeons and the role of professor was combined with that of Consulting Surgeon to the Army, a largely administrative appointment. Only recently has the position been clarified and the three tasks of administration, teaching and research, and clinical surgery been clearly defined. At present the Department of Surgery has the task of keeping alive the knowledge of special methods of treatment of war wounds, which in the past has been allowed to lapse during peace, with deplorable results in each campaign. It is indeed tragic to read the history of military surgery and realize that the same mistakes have been made at the outset of each war and only at the cost of much unnecessary suffering and death have the forgotten lessons been relearned by bitter experience.

The Department also conducts research into the application of modern surgical methods for war surgery—at present the histological, biochemical and mechanical results of experimental gunshot wounds are being studied, and a new type of lightweight splint is being evolved. As well as the study of military surgery the Department is also responsible, under the Director of Studies, for carrying out the postgraduate training of Army Surgeons, in which task the liberal assistance of many hospitals, both in London and in the Provinces, has been invaluable. The Department also co-ordinates statistical research into such problems as inguinal hernia, tibial fractures and malignant disease in the Army.

In short, the functions of the Department are the two facets of military surgery; the surgery of war, and the special aspects of general and traumatic surgery, so important in young soldiers, a study for which Sir Heneage Ogilvie, formerly Consultant Surgeon to the Army, has coined the word Ephebiatrics.

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PROFESSOR
                 SURGEON GENERAL SIR T. LONGMORE. BRIGADIER C. H. Y. GODWIN.
      1860-1891
      1891-1892
                  COLONEL W. H. STEVENSON.
      1892-1905
      1905-1910
                 COLONEL C. G. SPENCER.
      1910-1920
                 COLONEL E. M. PILCHER.
      1920-1924
                  MAJOR J. W. WEST.
      1924-1927
                  LIEUT.-COLONEL G. DE LA COUR.
      1928-1932
                  MAJOR J. M. WEDDELL.
                  MAJOR-GENERAL J. W. WEST.
      1932-1935
                  COLONEL J. M. WEDDELL.
      1935-1939
      1939-1940
                  COLONEL B. BIGGAR.
      1940-1940
                  COLONEL D. C. MONRO.
      1940-1943
                  COLONEL J. M. WEDDELL.
      1943-1945
                  Major-General D. C. Monro.
      1945-1948
                  BRIGADIER D. FETTES.
      1956-1959
                  COLONEL A. G. D. WHYTE.
                 LIFUT.-COLONEL P. R. WHEATLEY.
      1959-1960
      1960
                  COLONEL J. C. WATTS.
  ASSISTANT PROFESSOR (First recorded in 1867).
      1867-1873 SURGEON MAJOR W. A. MACKINNON.
                 SURGEON MAJOR J. H. PORTER.
      1874-1875
                 SURGEON MAJOR F. P. STAPLES. SURGEON MAJOR R. TOBIN.
      1876-1880
      1881 1885
                  SURGEON MAJOR C. H. Y. GODWIN.
      1886 - 1891
      1892-1895
                 SURGEON CAPTAIN H. R. WHITFHEAD.
      1896-1902 Major W. Dick.
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DEPARTMENT OF ORAL PATHOLOGY

Brigadier D. V. TAYLOR F.D.S., R.C.S.

Consulting Dental Surgeon to the Army

THE Army Dental Service is now recognized as an integral part of the Army Medical Services, and in recent years teaching and research in dental surgery have been pursued in the Royal Army Medical College. In 1954 the Director of the Army Dental Service was made a Member of the College Council, and since 1941 the Consulting Dental Surgeon to the Army has been on the Staff of the College where he now gives lectures in Dental and Maxillo-Facial Surgery to the Junior and Senior Courses for R.A.M.C. officers. A department of Oral Pathology was recently established for the purpose of collecting material and carrying out research and teaching in that subject.

continued from previous page

Title changes to CLINICAL TEACHERS.

1905-1906 A. PEARCE-GOULD. 1905-1906 S. BOYD. 1906-1908 G. H. MAKINS. 1906-1908 H. F. WATERHOUSE. 1909-1912 W. H. CLAYTON-GREENE. 1909-1912 MAJOR H. S. COLLIER. 1913-1914 W. H. CLAYTON-GREENE. 1913-1914 MAJOR S. BOYD. 1914-1915 A. E. S. BARKER. T. H. KILLOCK. T. P. LEGG. 1914-1915 1914--1915 1915-1920 A. E. S. BARKER. 1915-1920 Т. Н. КILLOCK. 1915-1920 T. P. LEGG. 1915-1920 H. S. CLEGG. 1915-1920 G. R. TURNER.

Title reverts to ASSISTANT PROFESSOR.

1932–1933 Major J. M. Weddell. 1933–1937 Lieut.-Colonel B. Biggar. 1937–1938 Colonel C. M. Finny. 1938–1940 Lieut.-Colonel D. C. Monro.

Title changes to READER IN MILITARY SURGERY.

1946 1948 LIEUT.-COLONEL D. C. BOWIL.
 1948 1949 LIEUT.-COLONEL D. ETTLES.
 1949 1952 LIEUT.-COLONEL J. A. McDOUGALL.

Title reverts to ASSISTANT PROFTSSOR.

1952-1956 LIEUT.-COLONEL R. A. STEPHEN 1956-1958 LIEUT.-COLONEL R. E. WATERSTON

DEPARTMENT OF ARMY HEALTH

Colonel J. L. GORDON O.B.E., M.R.C.S., L.R.C.P., D.P.H.

Professor of Army Health

Over my fireplace at the Royal Army Medical College hangs a portrait of Doctor Edmund Alexander Parkes, M.D., F.R.C.P., F.R.S., first Professor of Hygiene in the Army Medical Practical School when it opened at Fort Pitt, Chatham, just 100 years ago. This wise and kindly man was to create a system of instruction in military hygiene that found acclaim among his contemporaries and has stood until our times. In this he worked from three basic propositions: first, his subject was of profound military importance; second, although his class was to be composed of qualified medical men, selected by open examination as being "thoroughly grounded in all branches of civil surgery and medicine, including midwifery," it was recognized that their studies hitherto would have largely neglected sanitary science in general and military hygiene in particular; and third, this very necessary study could be usefully pursued only in a military environment. The importance of these points would have already been quite clear to Dr. Parkes. He had given evidence to the Royal Commission on the quality, knowledge and further education of army medical officers and is said to have been consulted by Sidney Herbert (Jenner, 1876) about the constitution of the new school. In 1855 he had gone to the Crimea at the request of the Government to organize and superintend a civil hospital, which he sited at Renkioi, to relieve the pressure on those at Scutari. Here he had the opportunity of renewing his study, begun during his service in India as Assistant Surgeon to the 84th (York and Lancaster) Regiment, of the importance of military sanitation and the consequences of its neglect. It was in Renkioi that Florence Nightingale made his acquaintance. She became so impressed with his knowledge and understanding of the sanitary needs of the army that she later nominated him for the post of Professor of Hygiene in the new school and had much correspondence with him over its syllabus. It was Miss Nightingale who wrote that formerly medical officers "certainly had never been instructed in the most ordinary sanitary knowledge, although one of their most important functions was hereafter to be the prevention of disease in climates and under circumstances where prevention is everything "(Cook, 1914).

That newly joined medical officers, however thoroughly grounded in general medicine, needed further and special education to fit them for military practice, was no new idea. Neal has told us how in 1798 John Bell had urged the establishment of one "great school of military surgery" and how this led up to the foundation of a Regius Chair of Military Surgery at Edinburgh University. Dr. Robert Jackson had advocated in his celebrated treatise of 1805 the establishment of an "Army Medical Practical School" and recommended a system of education for military medical officers, including instruction in sanitation. At the instigation of Sir De Lacy Evans

and other general officers a Chair of Military Surgery at Dublin was endowed by Government in 1851 and to it was appointed Dr. Thomas Jolliffe Tufnell who had begun a course of lectures in the subject in 1846. As Deputy Inspector General Thomas Longmore, the first Professor of Military Surgery, pointed out in his address at the opening of the Army Medical Practical School, the term "Military Surgery" covered also military hygiene, tropical medicine and other subjects connected with military medical service. In one important respect, however, these University Chairs failed to meet the recommendations of Robert Jackson. He had urged that the proper study of these subjects must be in a military environment and had suggested the Isle of Wight, with its depots of recruits and invalids, as a suitable place for an army medical school. He added that London, with the Guards and troops quartered there as well as the pensioners in Chelsea, might come to be a better situation and noted that Dr. Pinckard, deputy inspector general of hospitals, had "some years ago" proposed that the regimental hospitals of the Guards be combined into a brigade hospital which could become a "School for the education of medical men intended to serve with the Army." In view of the subsequent moves to Netley and to Millbank these early suggestions for the siting of the army medical school seem prophetic. They were made because their authors understood that study amongst soldiers well and sick, young and old, recruits and veterans, would be "infinitely more instructive than anything that is seen or learned in hospitals, not military."

For many years, then, thoughtful men had seen the importance of army medical officers being well versed in sanitary science and military hygiene; they had recognized that instruction in these matters was wanting in the civil schools and hospitals and had urged the establishment of an army medical school where they could be taught amongst the subjects of their study—soldiers in health and sickness and the circumstances in which they serve. Now these principles had been clearly stated by the Royal Commission in 1858 whose recommendations had at last been implemented by Government and the War Office. The Commission was especially insistent that the military specialties including hygiene could be properly learnt only after joining the service, studying in a military environment and amongst soldiers.

"The medical officer should therefore not only be thoroughly conversant with sanitary science, but with the mode of its application to the preservation of health under every possible variety of circumstance and character. . . . It is in a military hospital alone, and from professors specially qualified to communicate it, that the probationer can acquire the knowledge which is indispensible to the proper exercise of his profession in the Army. The habits and temper of the soldier are formed by the peculiar life which he leads, and the discipline to which he is subjected must be thoroughly understood by the medical officer."

What kind of a syllabus did Parkes prepare to make the most of the opportunity thus given him? No better description can be found than these words of his colleague Longmore in the address already quoted:—

"Instruction will be given in all the causes which specially affect the health of soldiers, whether diet, clothing, habitation, education, habits, and mode of life, their peculiar duties in time of peace, or situation and circumstances in time of war. The methods of determining the quality of the water the soldier drinks,

of the air he breathes, and of the several articles of his food, detecting their deficiencies, adulterations, or impurities, will be described and demonstrated; and each candidate, in turn, will repeat, in the laboratory the processes he has heard described in the lecture room. The principles of ventilation, warming, draining, cleansing, and of all architectural arrangements which may render his barrack healthy or unhealthy, and the best means of remedying these when faulty from original construction, will be explained and illustrated.

"In addition to the subjects I have already named, the professor of hygiene will consider the effects of military exercises, and the advantages of a regulated system of gymnastics; the conditions connected with particular soils and geological formations; camp diseases and army epidemics, their causes and management, and the preventive measures necessary to be adopted to meet the various sources of these and other diseases, whatever their origins may be. The effects of military life in Great Britain, in the colonies, in campaigning in various climates, in bivouac tents or huts, on board transport ships, will also be shown; and the sanitary regulations required for the preservation of the health and efficiency of the soldier in each condition explained; and to make the course more practical, in addition to the illustrations afforded by diagrams and models, the professor proposes to accompany his class in visits to barracks, transports, encampments, etc., whenever an opportunity of doing so shall be available."

Of later years some have tended to equate hygiene with cleanliness and sanitation with disposal of waste and even to imply that such mundane affairs are hardly worthwhile subjects for study by qualified medical men. It is apparent that the giants of those days, taking a wider view, balanced their opinions more firmly.

In 1863 the Army Medical School moved to the newly opened Royal Victoria Hospital at Netley where the hygiene laboratories were housed in appropriations behind the hospital, and in the following year Parkes published the first edition of his Manual of Practical Hygiene. This book was devoted particularly to military hygiene, but in compliance with the request of many, the fourth edition (1873) was enlarged and re-written in a form adapted for civil Medical Officers of Health. After Parkes's death three more editions were edited by his successor as professor, Surgeon Major F. S. B. F. de Chaumont, M.D., F.R.S., and an eighth edition edited by the third professor, Colonel J. L. Notter, M.D., was published in 1891. This work therefore covers the period during which the microbial origin of infectious disease came to be accepted and the causative organisms of many diseases were indentified. It is fascinating to trace, through the successive editions, the gradual shift of emphasis in teaching as new facts came to be accepted. Curiously enough, the transmission of disease by micro-organisms in water was not recognized until very late in this period. In the 1887 edition of Parkes's Manual, De Chaumont discusses the role of "Bacteridia" in the causation of infectious disease, but attributes water-borne disease to the presence of harmful chemical poisons, of animal origin but not living. He mentions that Koch connected cholera with a comma-shaped bacillus, but records that an Indian Office committee reported that they did not think the connection positively made out. In 1896, Notter and his assistant (later to become the fourth Professor and the original Editor of the Journal of the R.A.M.C., Colonel Sir Robert Firth, K.B.E., C.B., F.R.C.S.) published their *Theory and Practice of Hygiene*. Although based on Parkes's *Manual* this was much altered in character, being written principally as a textbook of public health, with special chapters dealing with the sanitary needs of the Army and Navy. In this work it is accepted completely that an attack of an infectious disease implies "the action of microbial life or the products of microbic life" and further that the microbe "was the progeny of a similarly endowed parental microbe." The demonstration in water of the actual bacteria associated with certain water-borne diseases is called "recent," cholera and enteric fever being cited as the two diseases in which the connection is generally recognized as certain.

It might be thought that such important discoveries and new concepts of the causes of infectious disease and their means of spread would have vastly changed the character of the subject and the content of the syllabus of hygiene, but this is not so. In the successive editions of Parkes's Manual only two chapters, "Prevention of Common Diseases" and "Disinfection," are much affected. The reason is that, important though these advances were, they concern only a comparatively small part of the vast field. In a subject involving the study of the physical, chemical and biological environment of the soldier, as well as his behaviour within that environment, concepts had altered about only some part of the biological environment. This view is supported by examination of the syllabus of instruction in the Regulations for the Guidance of Candidates attending the Army Medical School at Netley. We are able to compare the Regulations of 1866 with those of 1898. By far the greater part of the course is occupied with the study of the physical and chemical environment of the soldier and his behaviour therein; the approach to this study and the matter considered did not alter greatly over the three decades. The new concept of infection affected only a small part of each syllabus; so far from increasing the time spent on infectious disease, recognition of specific living causes, by simplifying study, brought it to occupy a smaller part of the whole. The next decade was to see the discovery of the role played by arthropods in an increasing number of infections and again the effect on the broad scope of hygiene was less than might have been supposed. only the study of the biological environment being seriously altered in character. However, the introduction of the subjects of insect control and disinfestation did result in some expansion rather than simplification of this part of the syllabus.

In 1901 successive recommendations by the Royal Commission on the South African Hospitals, by the Broderick Committee set up to consider the re-organization of the Royal Army Medical Corps and by the newly constituted Army Medical Advisory Board, resulted in a decision that the Netley School should be absorbed in a new College to be erected at Millbank where a general military hospital was being built. A Royal Warrant embodying these recommendations appeared in March 1902 and thus gave effect to the proposal made by Dr. Robert Jackson nearly a century ago and by Inspector General Pinckard before him. The last complete course of the Army Medical School at Netley closed on 29th June, 1902, with a prize giving and address by Earl Roberts. The hygiene and pathology departments were then the first to move to London, finding temporary accommodation in laboratories rented from the Royal Colleges on the Embankment, whilst their student officers were put up in a hotel (Macleod, 1906). When the Royal Army Medical College opened in

1907, the hygiene department moved into the laboratories and offices which it still occupies.

In the new College, as well as the long established course for Officers on Probation, a course was run for Captains before promotion to Major. This senior course lasted six months and in 1912 was extended to nine months. It came to be recognized as one of the most thorough and important post-graduate medical courses (Macpherson, 1921). The Royal Commission of 1901 had recommended the appointment of "properly qualified officers of the Royal Army Medical Corps to undertake sanitary duties," a practice which had been discontinued against medical advice (Lovegrove, 1952). It seems likely that the special training of these officers was also undertaken at the College, although no record of this has been found. It was in this period before the First World War that Colonel (later Brigadier General) Sir William Horrocks, K.C.M.G., C.B., who had been Assistant Professor in the Department of Hygiene (1897-1903) and was for over 30 years Editor of the Journal of the R.A.M.C., revolutionized the treatment of water in the field by developing the cloth filters and subsequent sterilization by one part per million of residual chlorine over a contact period of 30 minutes. Professor G. Sims Woodhead (1914) suggested a test for measuring the deviating power of a water using iodine and starch as an indicator. The practical adaptation of this for field use was incorporated in the test box which came to bear Horrocks's name and has only recently been superseded. The regimental water cart which embodied these techniques was developed under Horrocks's direction.

At the outbreak of war in 1914 teaching at the College ceased, except for occasional special classes; the Professor of the time became Deputy Director of Hygiene to the British Expeditionary Force in France, and the remainder of the staff were employed in research, development and testing of apparatus, chemicals and techniques. Work done included the analysis of the nutritional values of various foodstuffs, the calculation of dietary needs of patients in hospital, the development of vitamin tablets, devising means of disinfestation and testing the efficiency of insecticides against lice, and the development of plant for large scale purification of water in the field. During the war the Department moved to Professor Starling's Physiology Laboratories at University College to free their own laboratories for use by the antigas committee under Horrocks. The story of how our defences against chemical warfare were developed speedily and so successfully as to outmatch and overtake the enemy's lead has been told by Lelean (1920). Colonel P. S. Lelean, C.B., C.M.G., F.R.C.S., D.P.H., became professor after the war, but in 1914 he was given the task of organizing the Royal Pavilion in Brighton to receive Indian patients from Southampton where they had been crowded after a fire in a hospital ship. Starting work on a Saturday with hastily mobilized Boy Scouts and other volunteer helpers, he had the Pavilion and Dome ready for patients by the Wednesday. It is amusing to read that his first task in fitting this royal residence for use as a hospital was to clean it out and lay linoleum. Lelean's arrangements were such as to receive the commendation of the Secretary of State and Sir Walter Lawrence, His Majesty's Special Commissioner in charge of Indian Troops' Welfare (Lelean 1915). This was an outstanding example of a not unusual event—a military hygienist turning his hand to an administrative task with considerable success. It was during the time at University College that



Major Stanley Elliott joined the department as Chemical Analyst and began his long years of faithful service to this College during which he has made so many contributions to our knowledge and methods, notably in the sphere of the treatment of field water supplies. He gave us the Millbank bag and the Neutral Red test which replaced Horrocks's test in 1956.

After the war, the Department returned to its old premises and teaching was resumed at the College. Senior and Junior Medical Officers' Courses were held and Specialist officers studied for the Diploma in Public Health. The excellent chemical class room afforded them ample space to learn and practise the analyses which were then such a feature of the training for the Diploma. Classes were also held for R.A.M.C. tradesmen training as Laboratory Assistants. On the outbreak of the Second World War in 1939, regular teaching at the College again ceased and the Department was largely given over to research and development. In 1940, as a result of bomb damage to the building, the Department was evacuated to Mytchett, where it joined the Officers' Wing of the Army School of Hygiene until it was possible to return to Millbank in 1943.

Regular classes were resumed soon after the end of the War. The first post-war Senior Course was in 1946 and Junior Courses started again in 1951. The two courses are at present run in one, and instruction in the Department is in basic military hygiene although visits are made to civil installations such as water works, sewage disposal works, dairies, catering establishments and so on. Officers studying to be Army Health Specialists attend more advanced courses in military hygiene and have to pass the course examinations as a condition of classification as junior specialist and again for advancement to senior specialist. As these are the only tests of such officers' knowledge of military hygiene, the examinations, especially the second one, are conducted with the help of an External Examiner and are very searching. College is recognized by the Examining Board in England for teaching for the Diploma in Tropical Medicine and Hygiene, the course being run as an extension of the Senior and Junior Officers' Course; instruction in environmental and tropical hygiene, nutrition, applied physiology and statistical method is given in the Army Health Department. The revision of the General Medical Council Rules governing the course of study for the Diploma in Public Health which was made in 1945 resulted in much less laboratory work being required. The chemical laboratories of the Department came to be correspondingly less used for teaching and the staff have been more and more employed on advanced biochemical tests and estimations on specimens sent in from Army Pathology laboratories all over the world. One half of the class laboratory was screened off and in it has been established a teaching display, taking the place of the historical museum, the decline of which was recorded by Neal (1957). The other half is still used as a class laboratory where officers' classes practise such things as water testing and purification and the measurement of air conditions, and in which classes of Laboratory Technicians are trained in Public Health work and biochemical techniques. The benches in this laboratory are also used for demonstration by the Department of Entomology and others.

A Centenary is a time for reviewing the present as well as recalling the past. As one compares the present syllabus with that of Dr. Parkes one sees many changes.

Some dead wood has been cut out; some growth has been pruned or trained in a new direction. Several old trees have been felled and new ones planted. Of these, some are already full-grown and flourishing, others still need to be carefully tended; the proper place and size of some of the newer ones have yet to be determined. Here and there we see old friends still standing as strong and firm as ever. Some even support parasitic growths, whose usefulness must be kept under consideration; we must not be drugged with honevsuckle, nor bewitched with mistletoe. But when one stands well back from the trees and looks at the wood one cannot discern any very great change in its appearance and outline or in the place it occupies in the general scene. The prime object of study is still the military environment and the soldier's work and behaviour within it. Parkes's three basic propositions are still valid. In campaigns and exercises over the world the profound military importance of the subject is continually being demonstrated by the consequences of its neglect. Despite improvement in the instruction of medical students in public health and social medicine the knowledge of these subjects shown by most newly joined medical officers is still far from sufficient and they lack entirely the ability to apply themselves knowledgeably to military problems. The basic study of the military environment can still be undertaken only within that environment. To study the circumstances of soldiers one must be among soldiers.

At the opening of the Army Medical Practical School at Fort Pitt in 1860, Mr. Sidney (later Lord) Herbert is reported as saying that there was "no opportunity of learning elsewhere much that would be taught in it," and the Royal Army Medical College is still unique among post-graduate institutions in this respect. In the Department of Army Health we have the privilege of providing a course of study which cannot be obtained in the civil medical schools. The Royal Commissioners of 1858 found that only from specially qualified professors could the probationer learn his profession in the Army. Believing that only service in the discipline of Army Health can qualify a man to teach this subject and hoping that our own training and experience has fitted us adequately for the work, we in the Department are resolved to provide a course, as practical and interesting as we can make it, which is strictly related to the military field and has as its purpose to equip a medical officer to "recommend to . . . officers commanding any precautionary or remedial measures ... that may, in their opinion, conduce to the preservation of the health of the troops." This definition of a medical officer's primary work has also remained unaltered for a century in Regulations for the Medical Services of the Army.

The richness of our inheritance from Dr. Parkes has not been fully told. One of the things which makes service as a medical officer so well worth-while is that in the simple exercise of one's duty, one can do so much to help the ordinary soldier. The practice of military hygiene is full of such opportunity and we try to infuse our teaching with something of the spirit and humanity of the man who so richly earned the eloquent tribute paid to his memory by Baron Mundy, Professor of Military Hygiene at the University of Vienna, "All the armies of the Continent should, at parade, lower their standards craped, if only for a moment, because the founder and best teacher of military hygiene of our day, the friend and benefactor of every soldier, Edmund Parkes, is no more." (Orsborn, 1876)

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PROFESSORS OF MILITARY HYGIENE OR ARMY HEALTH

1860-1876 DOCTOR E. A. PARKES.

1876-1888 SURGEON MAJOR F. S. B. F. DE CHAUMONT.

1888-1900 LIEUT.-COLONEL J. L. NOTTER.

1900-1906 COLONEL R. H. FIRTH.

1906-1908 COLONEL A. M. DAVIES.

1908-1912 COLONEL C. H. MELVILLE.

1912-1914 COLONEL W. W. O. BEVERIDGE.

1919-1921 LIEUT.-COLONEL, P. S. LELEAN.

1922-1926 LIEUT.-COLONEL J. A. ANDERSON.

1926–1928 COLONEL P. H. HENDERSON.

1928-1930 COLONEL R. B. AINSWORTH.

1930-1933 LIEUT.-COLONEL N. LOW.

1933-1935 COLONEL G. S. WALLACE.

1935-1938 COLONEL W. B. PURDON.

1938-1939 COLONEL D. T. RICHARDSON.

1944-1946 COLONEL C. S. RYLES,

1943-1944 COLONEL T. F. KENNEDY.

1946-1948

1948-1949 COLONEL F. C. HILTON-SERGEANT.

1949-1953 COLONEL A. E. CAMPBELL.

1953 1956 COLONEL P. J. L. CAPON.

1956-1958 COLONEL R. J. NIVEN.

1958 COLONEL J. L. GORDON.

DEPARTMENT OF ARMY PSYCHIATRY

Lieutenant-Colonel H. POZNER

M.C., M.R.C.S., D.P.M., R.A.M.C.

Assistant Professor of Army Psychiatry

THE Department of Army Psychiatry is the youngest in the Royal Army Medical College, just as the Directorate of Army Psychiatry in 1942 became the newest of the War Office Medical Directorates. Its creation followed the growth of military psychiatry during the war and the insight of doctors and administrators into the contributions of preventive and curative psychiatry to the maintenance of human efficiency in the fighting services. The early years of this new specialty were difficult, dogged by uninformed criticism and prejudice, and the foundation of the Department of Army Psychiatry in 1946 represented official approval of this controversial expansion of military medicine. Appropriately the first Reader in Army Psychiatry at the College is now the Civilian Consultant Psychiatrist to the Army. In common with the other departments, the title of Reader was changed in 1951 to that of Assistant Professor, while the more executive functions of the professor in this subject were contained in those of the Director of Army Psychiatry at the War Office.

With the wealth of pathological and control material readily available from army sources, the systematic compilation of data on the psychology of the soldier in peace, still a new field, was a main point in the original charter of the Department. With this in view, Mr. Basil Clarke was appointed Clinical Psychologist to the Department in 1948; besides teaching, he standardized methods of psychological testing and started several useful research projects. He resigned in 1958 when his post was transferred to the establishment of Netley, where it was more urgently needed. In 1949 the Department moved into the more spacious, if semi-subterranean, room in the basement of the Commandant's House, from which it has so far resisted periodic attempts at eviction.

The Heads of this Department have been given a remarkably free hand in their choice of professional activities, and each reader or assistant professor has made his characteristic contribution to the teaching and investigation of all aspects of service psychiatry. One of the more valuable innovations, introduced by Lieut.-Colonel Chevens was the periodical circulation to all army psychiatrists of Excerpta Psychiatrica, a collection of abstracts of articles from many sources. Apart from post-graduate lectures and clinical and advisory functions in the Queen Alexandra Military Hospital, the value of the Department lies in the opportunities for close liaison with other consultants, and in the great scope for research into the special stresses of a military society. In 1958 the appointments of Assistant Professor of Army Psychiatry and Command Psychiatrist, Eastern Command, were combined for the better provision of both teaching and clinical facilities, a significant step.

The roots of the Department stretch beyond its fifteen years' existence at Millbank. It is not generally known that military psychiatry was established from 1711, when in the Royal Hospital at Kilmainham in Dublin "lunatic soldiers" were cared for over

a period of 140 years. In 1819, following complaints of harsh treatment of soldiers in English mental hospitals, a military asylum was built at Fort Clarence near Chatham, and there humane management and occupational therapy were practised long before similar, but now historic, measures were introduced into the institutions of Lincoln and Hanwell. It was only in 1870 that the centre for Army Psychiatry was established in the Royal Victoria Hospital, Netley, where "instruction in lunacy" became a recognized feature of the curriculum on Saturday mornings for surgeons on probation. Teaching in psychiatry was still given in D Block after the removal of the medical school to London in 1902. There are very close links between the Department of Army Psychiatry at the College and the Psychiatric Wing at Netley, where with improved accommodation, new insulin and research units and an active psychological department, there are adequate and fully recognized facilities for the training of State Registered Mental Nurses and preparation for the post-graduate Diploma in Psychological Medicine.

This Department has been founded on a long and creditable history of specialized service to the Army. During its short life it has already influenced many military activities. Its aims are to protect the mental well-being of the soldier and his family, and to make every medical officer more aware of his powers of social observation and human understanding.

READERS IN ARMY PSYCHIATRY

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1946–1947 LIEUT.-COLONEL R. F. TREDGOLD.
1947–1948 LIEUT.-COLONEL E. H. LARKIN.
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ASSISTANT PROFESSORS

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    1948-1952 LIEUT.-COLONEL L. C. F. CHEVENS.
    1953-1956 LIEUT.-COLONEL J. F. D. MURPHY.
    1956 LIEUT.-COLONEL J. MCGHIE.
    1956-1957 LIEUT.-COLONEL H. POZNER.
    1958-1960 LIEUT.-COLONEL J. MCQUILLAN.
    1960 LIEUT.-COLONEL H. POZNER.
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THE V.C. ROOM

Major-General W. D. HUGHES C.B., C.B.E., Q.H.P., M.D., F.R.C.P.(I)., D.T.M. & H. Late Commandant, Royal Army Medical College

COLONEL H. E. R. James, the first Commandant when the College opened on its present site in 1907, was himself a keen artist and wood carver. Although we are not sure who first thought of a V.C. picture gallery, it would appear natural that Colonel James should be prompted to it by the large number of medical V.C's. No fewer than 22 Victoria Crosses had been won by members of the Medical Services of the British Army between 1856 and the end of the South African War. The artist responsible for most of the early pictures was Hassall, a very well-known military painter, also a poet, who died in 1948. His son and daughter can remember practically every picture being painted. He did all except Mouat, Sylvester, Jee and Home, that is 18 of the 22. The earliest pictures represent the Crimean War V.C's.—Mouat, Sylvester and The next belong to heroes of the Indian Mutiny-Read, Bradshaw, Home, McMaster and Jee; they are very colourful pictures of vivid action. Assistant Surgeon Read is depicted defending his wounded with drawn sword from falling into the hands of the enemy; but Chapter XII of The Book of the V.C. relates: "There are no more honoured names than those of Jee, McMaster, Home and Bradshaw, whose deeds though unostentatious should appeal to our imagination no less forcibly." A romantic story lies behind them all: that of McMaster comes to mind easily, for his V.C. was awarded to the whole regiment, the 78th Highlanders, who then selected their Medical Officer as the most worthy recipient. Further along come two V.C's. won in New Zealand by Temple and Manley. The picture of Assistant Surgeon Douglas next stands out, because his V.C. was awarded for valour "not gained in action." Douglas and four men of the South Wales Borderers each gained V.C's. for the very gallant and daring manner in which they risked their lives manning a boat several times through dangerous surf, thereby saving the lives of 17 officers and men. The picture of Surgeon-Major Reynolds shows this brave officer at Rorke's Drift conveying ammunition from the store to the defenders of the Hospital, whilst exposed to continual fire. The remaining Hassall pictures include one of the first South African War, Lance-Corporal Farmer, who won his V.C. at Majuba Hill, Lloyd and Le Quesne of the Burma War and the group from the Boer War, Major Babtie, Captain Crean, Lieutenants Douglas (later to be a commandant of the College), Inkson and Nickerson and Captain Martin Leake, who won a bar to his V.C. in the Great War. From the artist's point of view the pictures of Bradshaw and Surgeon Douglas (manning the boat in mountainous seas) are said to be Hassall's best. Next come the seven pictures of Great War heroes, some by Cooper; others by Jowett are action pictures of Ackroyd, Allen, Chavasse (Double V.C.), Green, Maling, Rankin and Fox-Russell. Finally the only V.C. of the Second World War, Lance-Corporal Harden, fittingly done by Colonel R. S. Hunt, R.A.M.C.

The pictures were at first hung in the Ante-Room, later in the Dining Room, and finally, as the number increased, they were put together in the Board Room downstairs. The pictures were in simple dark oak, which became cracked and chipped by many

moves during two world wars. The Board Room itself was sombre, decorated with the usual shades of dark wagon green and dirty ochre. In these frames and this setting the pictures obviously lacked something. In 1957 our present Director General, Sir Alexander Drummond, consulted John Carter who suggested new frames and who redesigned the room. It is now a bright room, with a grenadier red carpet, silver-grey Regency wallpaper and velour curtains, and attractive modern crystal lighting. The furniture is upholstered in a pale sage green, with two low rosewood tables and four Chippendale chairs. The pictures are now in white box frames with a dark red velvet inset, the colour of the V.C. ribbon. They are arranged on two walls and above the mantelpiece on the third; this place of honour is reserved for the two double V.C's and the two Other Rank V.C's. On either side of the mantelpiece hang two red sashes. said to be the handiwork of Queen Victoria herself, and once worn by officers in their blue uniform; on these are placed the badges of the regiment to which the medical officers were attached when they won their V.C's. Thus the V.C. Memorial Gallery really came into being only on 10th December, 1957, when it was officially opened by Queen Elizabeth, the Queen Mother, our Colonel-in-Chief. Her Majesty remarked that it had made her visit and that the room must be kept alive at its present very high standard.

In 1958 Sir Alexander Drummond decided that it would be fitting if Commonwealth V.C's. were to hang beside those already in the Room. We therefore have a picture of Surgeon Crimmin of the Indian Medical Service done by Mrs. Gordon Edwards and two very attractive pictures by Miss Bury of the famous Canadian V.C's., Scrimger and Hutcheson. The two most recent pictures depict Hospital Apprentice Fitzgibbon, at 15 years and 3 months the youngest V.C. ever, painted by Mr. Brian Brooke, F.R.C.S., of Birmingham; and Captain Whitchurch of the Indian Medical Service, showing him bringing in a wounded officer at night. It is hoped to fill the few remaining gaps in this fascinating record very soon.

The guardianship of these reminders of bravery so valuable to the Corps has rested since the College came to Millbank with successive Commandants, a list of whom is given here:—

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1902-1908 COLONEL H. E. R. JAMES.
            COLONEL D. WARDROP.
COLONEL E. J. RISK.
1908-1911
1911-1912
1912-1914
            COLONEL B. M. SKINNER.
1914-1919 MAJOR-GENERAL SIR DAVID BRUCE.
1919-1920
            MAJOR-GENERAL S. GUISE MOORES.
            COLONEL H. A. HINGE.
COLONEL C. B. MARTIN.
1920-1922
1922-1924
1924-1925
            MAJOR-GENERAL C. W. MAINPRISE.
1925-1929
            MAJOR-GENERAL H. E. M. DOUGLAS, V.C.
1929-1930
            COLONEL J. S. BOSTOCK.
            MAJOR-GENERAL R. B. AINSWORTH.
MAJOR-GENERAL W. P. MACARTHUR.
1930-1935
1935-1938
1938-1940
            MAJOR-GENERAL W. BROOKE PURDON.
1940-1946
            MAJOR-GENERAL F. S. IRVINE.
1946-1948
            MAJOR-GENERAL E. B. MARSH.
1948-1949
            MAJOR-GENERAL J. C. A. DOWSE.
1949-1950
            MAJOR-GENERAL J. M. MACFIE.
1950-1953
            MAJOR-GENERAL F. R. H. MOLLAN.
            MAJOR-GENERAL F. C. HILTON-SERGEANT. MAJOR-GENERAL W. D. HUGHES.
1953-1957
1957-1960
            MAJOR-GENERAL W. R. M. DREW.
1960
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THE RUSCOE CLARKE MEMORIAL LECTURE "CARE FOR THE INJURED"

delivered at Birmingham University on the 25th of April, 1960, by

Lieutenant-General SIR ALEXANDER DRUMMOND

K.B.E., C.B., Q.H.S., LL.D., F.R.C.S., D.L.O.

Director General Army Medical Services

This Memorial Lecture commemorates a liberal minded surgeon who in the field of trauma was recognized as second to none. Alas for us, he being beloved of the gods was called early. This and future lectures will, I trust, not only keep his memory green, but inspire further generations to go forth as he would have wished, with new ideas on the care and treatment of the injured.

Although only a little time has passed since Alan Ruscoe Clarke's death, we are already better able to measure his stature. As one would expect from his early career at Guy's Hospital, he was a man of action, nimble and quick witted. He thought well ahead of most and strove with a passionate urge to put his well-reasoned and oftdiscussed ideas into practice. It was my good fortune to meet Major Ruscoe Clarke, Surgical Specialist, during the 1939-45 war. I well remember the occasion: he had just arrived as I was about to move off. I was immediately struck by his open countenance and friendly manner which, I was to learn later, had won him friends in many walks of life. He had already seen service in North Africa, had acquitted himself well in Italy and had been decorated, but of this he gave me no hint. It was spring time, things were going well for the Allies and, although there was much of interest around us, he was chiefly concerned with the problem of improving the standard of surgery. Ruscoe Clarke's vision was of an efficient overall care for the injured, a comprehensive surgical and medical cover from the time of the incident until the patient was restored to health and, if possible, to normal life. His watch words were "early surgery". For those of us who knew him, how fittingly do Blake's words describe his great zest for the task in hand:

Bring me my Bow of burning gold!
Bring me my Arrows of desire!
Bring me my Spear! O clouds, unfold!
Bring me my Chariot of fire!
I will not cease from Mental Fight,
Nor shall my Sword sleep in my hand,
Till we have built Jerusalem
In England's green & pleasant Land.

That I have been given the honour of presenting this inaugural lecture is perhaps because I came to know him well and shared his interest in the handling of the injured, in forward surgery and the necessary rehabilitation. He was always impressed by the organization of the Army Medical Services and by the breadth and depth of the cover

they provided. In this lecture then I would like to deal with the organization of the care of the injured during their most critical period—from the time of the incident until they reach the theatre for reparative surgery. In military and I believe also in civilian spheres this period is so important that if misused the most skilful surgery later will be of no avail. In the organization of the care of the injured and wounded the Army Medical Services have a vast experience it would be folly to ignore. Let me quote from despatches of Field-Marshal the Viscount Montgomery of Alamein. after World War II. He records the "truly remarkable success of the medical organization" and continues "doctors were prepared to lay fifteen to one that once a man got into their hands, whatever his injury, they would save his life and restore him to fitness. It is a fine thing that these odds were achieved with a handsome margin".

"We're not so old in the Army List But we're not so young at our trade."

Over the years this organization has depended for its efficiency upon the fixation of responsibility, in other words knowing exactly what one is expected to do, and on overall medical control. Any deviation from these tenets has invariably led to breakdown. To use Clarke's words, "There is plenty of scope for research into new methods of handling the severely injured patient". Today in the Army, to meet increasing and ever graver commitments, the standard of care for the injured is of necessity being steadily raised with the aim of forestalling complications such as wound shock. renal insufficiency and infection. The pre-operative phase must cover the period of immediate treatment after the injury, the evacuation of the patient and the immediate pre-operative preparation.

Training in First Aid

The first principle in handling the injured or wounded is that they should be evacuated in better condition than when received. At the place of the incident the responsibility for care falls on the soldier's comrades, the stretcher bearers, or the medical personnel of the battalion, all of whom have been trained in first aid and measures of immediate treatment. In civilian life this care usually falls on a good Samaritan who it is hoped has some knowledge of the job as did the man in the parable. Although this duty is a moral one it should be an administrative responsibility to provide the necessary training to do it well. Clarke rightly pointed out that "the care available to victims of any major disaster depends upon the general standard of medical care for the injured which exists in the community". So alive are the councils of St. John and St. Andrew Ambulance Associations and the British Red Cross Society to the need for raising the standard of care for the injured that they have agreed upon a common training and published a joint First Aid Manual for their members. Today, the increased incidence of traffic accidents alone warrants the demand for national training in first aid.

Most authorities consider that this training should start in school and be continued in organizations such as the Boy Scouts, Girl Guides and youth clubs. The Services with the aim of dealing not only with incidents in their civil capacity but also with the more severe effects of modern conventional and nuclear weapons have, since 1955, been training their personnel in appropriate first-aid measures. Yet, with this back-

ground it was found that during the operations in Cyprus there were five common faults in first aid due to the neglect of cardinal principles. These, as recorded by Colonel J. C. Watts in his 1960 Hunterian lecture, were:

Failure to secure an adequate airway.

Allowing the unconscious patient to inhale his secretions by failing to place him in the coma position.

Failure to obtain adequate fixation of fractures and support of soft tissue injuries.

Over sedating.

Giving fluids by mouth.

What was the cause of this breakdown? Were the methods of training at fault? Was the instruction unrealistic, or were the trainees bored by jargon and detail? The established methods of training were certainly at fault in continuing the academic discipline of demanding a basic knowledge of anatomy and physiology before allowing the trainee to display his skill and assume any responsibility.

For some time the Royal Army Medical Corps has been engaged in devising methods of speeding up the training of its other ranks and this, apart from any other considerations, has demanded a change in the system. Before 1959, recruits after passing the Depot Course were posted to military hospitals and other units for six months' qualifying training before sitting the examination. Today, with two extra weeks at the Depot, 92 per cent of recruits leave with their qualifying certificate, having in the meantime obtained the St. John Certificate in First Aid and Home Nursing. Sister tutors and the ward sisters report most favourably on the new interest which these young men show in their duties and their readiness to accept responsibility.

There is no doubt that this interest and achievement have been fostered by the newly-adopted induction method of training in which essential medical procedures are taught as techniques. For example:

Controlling haemorrhage.

Immobilizing fractures and supporting soft tissue injuries with plaster slabs. Setting up and operating intravenous drips and gastric suction.

Dressing wounds by the "no touch" technique.

Much research has gone into producing realistic conditions of injury, without resort to horrific spectacles or hysterical episodes which serve only to distract attention, and it has been established that a small class can be brought to a high degree of proficiency with forty hours of intensive training and practice. It is more important for the careful handling of the injured that the trainee appreciates that swelling after a closed fracture is due to extravasated blood than that his attention be drawn to the fact that it is a Monteggia fracture involving the radius and ulna.

Since the introduction of these training methods the standard of treatment and nursing of the injured has greatly improved, and so today the Army Medical Services are in a better position than ever before to meet this commitment. It is worthy of note that the medical services of the N.A.T.O. nations have been directed to adopt this method of procedure training.



The adoption by voluntary first-aid associations of medical procedure training. in the form of combined first aid and home nursing, would provide the potential for a big advance in dealing with emergencies like haemorrhage, burns or fractures. or purely medical incidents such as strokes, asphyxia or poisoning. A great deal of distress, time and money might thereby be saved. But before this form of training could be seriously considered the advanced first aider would have to have some assurance of his status, such as official recognition in the local accident service. Too often in the past he has been out on a limb and, feeling the need for cover for his actions, has had to look for support from any congenial passer by. Having completed his task he watches the collection of his patient with some satisfaction. His name and address are taken and he is now aware that for a time he has become a digit in a highly sectionalized organization. Are the ambulance attendants, the hospital staff, the doctors and nurses and surgeons, he wonders, just digits like himself? Who, he asks, controls this vast environment into which his patient has been thrust?

Consider the soldier first aider in a similar position. Because of his purposeful training he enjoys executive backing and his status is assured. In the formation in which he is serving he has first-hand knowledge and experience of the Army Medical "Set up" and is well aware of the overall control which looks after all wounded and injured. He is on speaking terms with many of the medical personnel and knows that if anything goes wrong with the medical organization somebody will want to know the reason why. Far from being a digit he considers himself a part owner.

Let us consider the civilian first-aid "Set up", should the procedure method of training of which I have spoken be accepted for treatment of accidents. Military and civilian first aiders in common work on the periphery of their respective catchment areas. Whether the background is civil with a military overlay, or vice versa, the pattern of immediate treatment, collection and evacuation of the casualty is fundamentally the same. Take for example an accident in an isolated village. A man has sustained a compound fracture of the leg. After treatment he will have to travel some distance to a general hospital and will pass en route the doctor's surgery and local hospital. The doctor is on his rounds. A change of names, and a standard military deployment is seen. The "on call" first-aid men report to their first-aid shelter (Company Headquarter level) for equipment. They have no difficulty in applying sterile dressing to the wound using the "no touch" technique, or giving the patient an intramuscular loading dose of penicillin and immobilizing the fractured leg in a plaster gutter. The patient is then taken to the doctor's surgery (Regimental Aid Post). Here he is documented, if possible seen by the doctor and normally sent directly to the surgical centre of the general hospital. If, however, there are any untoward signs or symptoms, he will first be taken to the local hospital (Advanced Dressing Station) for such treatment as is necessary before continuing the journey. To sum up, this pattern of organization requires:

Training of first-aid personnel in the medical procedures.

Their affiliation with and recognition by the general hospital.

That the local practitioner be medical officer in charge of the accident service and given a status such as clinical assistant at the general hospital.

Provision of stores and sterile dressings by the local hospital.

That the first aiders be asked to visit the hospital to see the progress of their patients and have refresher courses.

Arrangements to be made for group training and competitions.

In the accident service scheme drawn up by the British Orthopaedic Association no cognisance is taken of the voluntary first-aid associations, the members of which are doing sterling work in our industries, cities and rural areas. In the Services and more especially the Army, accident surgery and the effects of trauma are our business and we could not do our job without the help of personnel thoroughly experienced in first aid. The battle-experienced surgeons of Korea, Malaya, Kenya and Cyprus fully appreciated the work of the forward first aiders. Can any comprehensive service afford to overlook their contribution? Is it not, as Kipling said in another connection, "makin' mock o' uniforms that guard you while you sleep"?

Blood Loss and Wound Shock

Clarke considered that "the most important single factor underlying states of shock and leading to early death following injury is loss of whole blood by bleeding". Clinically the degree of shock runs parallel to the volume of blood lost from the circulation. In moderate shock up to one-third of the blood volume may be lost; if half, the shock is severe, yet full recoveries have been reported following a calculated loss of 75 per cent of the blood volume. Haemostasis, the turning off of the tap, is the first step in the treatment of wound shock. External haemorrhage even if severe can usually be stopped by the firm pressure of a pad over, or packed in, the wound. It is unwise to relax the pressure until the patient is on the operating table. In the severely wounded where vessels have been torn this is vital.

The following are examples of well-intentioned but meddlesome interference:

Case 1

To repel a gang of Chinese terrorists a party including a cook, mustered from the rear details of a company on detachment, were sent by lorry to the scene of an action. On arrival the lorry was sprayed by machine gun bullets and a soldier in a sitting position was shot by a single round through both thighs. The left was pulped and two inches of the saphenous and common femoral vein destroyed. The lorry turned into the side of the road and the casualty was pulled out into the ditch. Here the cook flexed the pulped thigh over a field dressing on to the man's abdomen telling him to hold it tight. As there was danger of the party being overrun the cook had to join in the fighting but returned during a lull to help his comrade. He then teased open a shell dressing, packed the gauze firmly into the wound and successfully stopped the bleeding. Some two hours later the wounded man was taken to a civil auxiliary hospital where the packing was removed and the wound found to be dry. A cotton wool and gauze dressing was placed over the wound and a saline infusion started. The patient was then transferred by ambulance car to the military hospital. During the journey he bled to death.

Case 2

A rifleman on patrol was caught in barbed wire and shot through the left leg, the anterior tibial vessels being destroyed. His companion in the dark opened up a field dressing and firmly packed its gauze into the wound so stopping the haemorrhage. The patient was eventually removed from the wire and placed in a



lorry for transfer to hospital. On the journey a call was made at a village health centre where his dressing was removed and the wound was inspected and found to be dry. It was dressed with lint and gauze, and the patient was given a bottle of mineral water to ease his thirst. He was then made comfortable in the back of the truck, but on arrival at the hospital was found to have died from further loss of blood.

The moral is that once a wound has been efficiently dressed as judged by the absence of untoward signs or symptoms, it should be left alone and no time lost in evacuating the patient to the place of definitive surgery.

Internal Haemorrhage

Following a fracture of the shaft of the femur severe bleeding to the extent of three or four pints may occur into the tissues with a rapid depletion of the blood volume in the circulation. Field experience shows that the tension due to the proper application of a Thomas splint usually arrests haemorrhage and prevents swelling of the thigh. If the patient with a fractured femur or tibia and fibula has to travel any distance or there is likely to be delay in evacuation, the injured lower limb should be put up in a Thomas splint. At times the haemostasis can only be achieved by massive transfusion. To restore a depleted blood volume and allow surgical approach to the site of the haemorrhage as many as twenty pints of whole blood have been given in an hour. Until the Korean War, Cyprus and the Suez affair such injuries were mortal and few of these casualties reached surgical aid. There is no doubt that a fit young man with a blood volume of nine to ten pints can well afford to lose one to one and a half pints of blood without need for replacement. If, however, after considerable physical effort, battle strain and perhaps dehydration, he is wounded and loses externally even one pint of blood, he is in a different category. Watts, on clinical grounds, considered that in such a case the actual loss from the circulatory volume was in the nature of two or more pints due to the additional loss of blood and plasma by extravasation into the tissues at the site of injury. Experience shows that clinically the severely injured man is better if he has received a blood transfusion before anaesthesia and operation.

Today, there is increasing pressure for early and adequate replacement of blood. The problem, however, has to be kept in proper perspective. Recently a serious request was made that cover provided for an important personage should include mobile blood banks, the blood and transfusion teams in ambulance cars to travel on parallel roads on either side of the route taken by him. In point of fact the distance from any point on the route to a teaching hospital could be covered in under five minutes. During the Suez affair, wounded were received within half an hour of disem-The time from wounding, including collection, evacuation by naval helicopter and placing in a hospital berth with a drip already set up, was in a number of cases reduced to fifteen minutes. In the Cyprus operations of 1956, the time between wounding and receiving a blood transfusion in a military hospital averaged one hour-Formerly, the state of the blood pressure, pulse rate and the surgeon's clinical sense determined the necessity for a blood transfusion. Today in traumatic and war surgery, blood loss to the outside or into a limb swelling is being calculated with more accuracy and the sometimes considerable loss during operation taken into account by the weighing of swabs. The criticism of the calculated amount for transfusion purposes is

that it is too lavish and, as far as army surgeons are concerned, poor training for war when it is expected that blood will be at a premium. If the Birmingham Accident Hospital Reports and the army case records are valid, the question is not Is this practice too lavish, but rather Has one the right to deny the severely injured patient, soldier or civilian, the calculated transfusion requirements?

At the present time it might be considered foolish to plan that in any major disaster or war there will be an unlimited supply of blood, yet I am informed that in the United States there is a hospital which is using red cells the storage life of which is from eighteen months to three years. On reconstituting, the cells are viable and the blood can be held for twenty-one or more days. This hospital, the U.S. Naval Hospital, Chelsea, Massachusetts, has a research laboratory devoted to the study of problems related to storage of blood. Following up the pioneer investigations of British workers* in this field the red cells are separated, mixed with glycerol and immediately frozen. The storage life is up to several years. After thawing, the cells are resuspended in their own plasma which has been stored separately or in a 5 per cent albumin solution, and this gives an acceptable substitute for fresh whole blood; the oxygen carrying capacity is about the same. O. H. Robertson in World War I stated, "The only means available of increasing the oxygen carrying power of the blood is the addition of new red blood cells. This constitutes the unique value of blood transfusion." Meryman has frozen red cells very rapidly by spraying whole blood into liquid nitrogen. It falls to the bottom as a red sand. Avoiding damage of the cells during thawing presents some difficulty. Whole blood in amounts of at least 200 ml. can be successfully frozen and thawed by first mixing the blood with a suitable sugar and then plunging it in a special thin container into liquid nitrogen. Investigations have reached a stage warranting further development by a commercial firm. In this country too an officer of the Army Emergency Reserve has been working at Millbank on this problem of storage of blood in nitrogen. One can therefore look forward with confidence to having practical methods of preserving red cells for long periods with a view to increasing available supplies against an emergency. Another possible development might be improvement upon the haemoglobin solutions which in 1938-39 Laurence O'Shaughnessy was successfully using in Lambeth Hospital.

There are two other factors to be considered in shock, namely, pain and thirst. In his Anatomy of Courage, Lord Moran draws a picture from the First World War. "Just now a man was brought to my dugout on a stretcher. Half his hand was gone, and his leg below his knee was crushed and broken. While his wounds were dressed he smoked lighting a new cigarette from the stump of an old one. His eyes were as steady as a child's, only his lips were white.—my servant grinned. 'You always know the old uns', he said." Immediately after severe injury pain is not usually complained

[•] The U.K. were the first in the field in the storage of red cells in the frozen state. Thus, following the discovery of Polge, Smith and Parkes in 1949 that glycerol would prevent the otherwise lethal effects on cells of freezing and thawing, Mollison, Sloviter and Chaplin in 1952 showed that red cells which had been kept with glycerol at —79°C. for six months would survive well in the recipient's circulation after transfusion.



of. The injured or wounded are stunned; later about one-third will complain of severe pain or distress, another third of slight pain while the remainder appear to be unmoved. The first essential in the relief of pain is the effective immobilization of fractures and adequate support of traumatized soft tissue. To reduce swelling, the cause of much pain, the injured parts should be raised where possible. Except in severe cases relief can usually be obtained by giving codeine or aspirin. There is a tendency for those in charge of the injured to be over generous in the giving of morphia. In the North African Campaign it was found advisable to restrict the dose to gr. 1. To prevent complications such as severe respiratory depression which may follow delayed absorption of morphia, the instructions in the Army are that it be given intra-muscularly, for even in the shocked patient there is a steady venous return from the deep tissues.

Thirst in the injured is invariably accompanied by anxiety and commonly by restlessness, an indication of a depleted blood volume. Oral fluids are not well tolerated and are contra-indicated if an anaesthetic is likely to be given in the near future. In severe injuries intravenous therapy is usually the best means of restoring the fluid balance. The usual props for civil and military exercises are transfusions of blood being given to patients while in ambulance cars or helicopters. Some people can recall that during the war they checked a drip set up in a patient before his evacuation in an ambulance car, but reports on the efficiency of such a transfusion are difficult to obtain. Observers in obstetrical emergency services are far from satisfied with the results. The practice in the Army is not to transfuse unless surgery is available, on the principle that one cannot divorce blood from surgery.

The greatest danger of transfusion still lies in the patient receiving the wrong blood. This is more likely to occur if no plan has been worked out to meet conditions of disaster. There is also the special risk in girls and young women who as the result of transfusion may become sensitised to blood antigens with the danger of jeopardising the lives of their future children. There are known to be at least eleven separate blood group systems and most of the blood group antibodies within these systems are known to be capable of causing transfusion reactions, although fortunately many of these antibodies occur only rarely. In the Army it is considered that in the case of a young female the loss of one-third of the blood volume should be the minimum criterion for an emergency blood transfusion and that all transfusions should be under the direct control of an experienced person supported by a reliable and conscientious staff.

To tide over the period when blood is being grouped it is usual to improve the blood volume with plasma or dextran solution. It is well known that dextran causes difficulty in blood grouping owing to rouleaux formation. Sludging of the cells and stasis which may not be reversible may also occur. The studies of Bruce and Stalker on post-mortem material from patients who had had dextran transfusions showed areas of necrosis in the myocardium, the kidney, muscle and skin. It is of interest to note that severely burnt patients who have been given dextran transfusions show as terminal features small metastatic abscesses.

Military Organization applied to Accident Services

A study of the development of the Moscow Accident Hospital, the Institut Sklifasowski, is of interest. Under the guidance of the late Professor Yudin it widened its scope to look after all emergencies, surgical, medical and obstetrical. This still did not provide the staff with the necessary clinical background so non-emergency cases were also admitted. When a call is received at the institute an ambulance car with a surgeon or physician and assistants leaves the hospital within two minutes. There are several accident stations throughout the City which are in direct communication with the main hospital. On admission the patient is received by a waiting team and is treated or operated upon without delay. Professor Yudin, to keep in touch with general surgery, himself performed at least one gastrectomy per working day and encouraged his staff to undertake routine medical and surgical work. As can be imagined control in this hospital is strict. I am informed that there is never any question of a patient waiting for any diagnostic service; all await the patient. Other ambulance services deal with minor emergencies which are attended to in the various subsidiary clinics. This service although large and efficient is parochial, serving only the precincts of Moscow. It is a very different proposition and more ambitious to organize an accident service whose cover extends in depth from the lone foreshore to a city centre. Further, it must be organized to meet any disaster, be it factory, rail or air, which occurs in its operational area.

The practice of military surgery covers the world wide care of accidents and battle casualties. It is not surprising that in the army these injuries arouse feelings of family hurt and quite often of indignation or that a high sense of urgency is developed not only in the hospital staff but in all who have to deal with the soldier and his dependents. In Cyprus the reception focal point was the hospital. Patients were evacuated to it by the field medical units who in turn took over the injured from the regiments on the periphery. The overall supervision of the collection and evacuation of the wounded was the responsibility of the A.D.M.S. The professional control or guidance from the front to rear was under the command consultant in surgery. The overall authority was the Director of Medical Services. Command of the hospital and its accident service is vested in the commanding officer who is responsible for the organization, administration and efficiency. If anything untoward occurs it is he who is called to book. Strange though it may seem, this system of responsibility and control, perhaps more than anything else, makes for a united whole. If the surgeon has any doubts about his patient's progress, the War Office consultants are immediately available and the honorary consultants to the Army are on call. If other authorities are required there is never any difficulty in getting their advice or arranging for them to be sent anywhere in the world. This happy position is probably not enjoyed by many others.

The Role of the Smaller Hospital

Although in World War I as a research expedient, a special hospital for fractured femurs was designated, the practice in the Army has always been to incorporate special units, such as neuro-surgical, orthopaedic or ophthalmological units, as sub-divisions into a general hospital so that they may benefit from the wider diagnostic and consultant facilities. In this age of rationalization, the sponsoring of an accident



hospital might appear to be partly an administrative convenience, to have a place to which after working hours all disquieting incidents may be referred. The necessity for an institute with its own hospital is nevertheless real. It is required for teaching and research and in these fields it should be autonomous. The good will of the profession and the various academic bodies is essential in order that it is not starved of clinical and other material. To free it from administrative chores, the institute with its hospital should be adjacent to a general, but not parent hospital, from which by a "tap water" system various services such as sterile supply, laundry, medical equipment and maintenance can be arranged. There is no need for the institute to be sited near particular arterial roads nor in the centre of an industrial area. It must, however, have modern and adequate transport, and the provision of a heliport on its roof should receive priority in planning. In one or two years' time congestion will make the evacuation of accident cases by ambulance car practically impossible. For serious emergencies this time lag will not be acceptable. It was the medical officers from Birmingham under Colonel Humphrey Humphreys who in Burma showed the way to early surgery in a suitable environment by using an air bridge. Today, except in cities and large towns where ambulance cars will still be used, air transport is becoming more and more essential. The success of the light general purpose helicopter in the ever increasing number of mercy and rescue flights, of which we hear so much, suggests that this type of craft would prove most suitable. The establishment of a helicopter ambulance service should be seriously considered and the first step is to form a helicopter consortium.

It is understandable why small hospitals, which as yet have not the means of providing a 24-hour accident service and have insufficient orthopaedic backing, are not favoured for inclusion in the planning of the future accident service. It is doubtful, however, if public or medical opinion will allow this type of hospital to be completely by-passed. The solution to the problem is to improve these hospitals. If their standard of accident care is poor and their staffs do not recognise the need for urgency, it is most unlikely that their other departmen's will merit praise. Here surely is an excellent opportunity for a transfusion of another type. Let the major hospital make a take-over bid by supporting one or two smaller hospitals by a "tap water" system of supply. Incidentally, this system of supply has been working very successfully in army hospitals. When a satisfactory improvement in standards is achieved such hospitals may yet play an important role in the accident service. If these hospitals are completely by-passed, have the welfare problems which will arise been considered? Is it in the best interests of the injured man that he should be peremptorily removed from familiar surroundings for surgical care at some distance? What welfare arrangements are visualized to inform close relatives of the patient's condition and progress or to provide accommodation for those who visit him when his life is in danger? Are they to receive free travelling facilities? Is there any provision for the patient who refuses to go to a particular hospital?

The treatment of the injured in peace and war must largely fall on the experienced general surgeon whose record of successfully treating war wounds, including a high proportion of compound fractures, by the method of delayed primary suture (D.P.S.).



remains second to none. Those of many nations whose business it is to provide surgical cover to meet disaster or war must still rely on him, backed as he may be now by a growing orthopaedic service. Although Clarke advocated the primary closure of wounds sustained in civil life his strict proviso was that "they must never be sutured if the patient is going to be moved or if facilities for careful supervision are not available." In the treatment of war injuries he was entirely at one with army policy and did everything in his power to further military surgery. It may be of interest to note that in the operations at Suez the only mistakes made in the treatment of wounds occurred in a small number of cases where primary closure was adopted. "They who forget the past are condemned to repeat it." This quotation used by Mather Cleveland when speaking of the lessons to be learnt in war surgery gives a warm and, if I may say so, well-earned tribute from the orthopaedic surgeons of the American Army to the success of our method of treating wounds by D.P.S. I am convinced that D.P.S. still holds an important place in the early treatment of civilian injury also.

During his evacuation to an appropriate hospital the patient may be seen by many people all of whom have a responsibility for either his supervision or treatment. They may extend over many miles. It is in his interests essential that they work as a team and that treatment is continuous. To obtain a concerted effort guidance in the management of the injured must be accepted. This in no way means direction of treatment. If treatment is not definitive it should be complementary to the subsequent operative procedures. The task of guiding an accident service should be vested in an eminent and suitable consultant who could with advantage be a general surgeon. It would be necessary for him to visit frequently the various medical establishments under his wing. He would have to watch training and recommend that adjustments be made in personnel to provide an efficient accident cover. By advice and suggestion he would be able to aid treatment and encourage research. He should be responsible for formulating policy and organizing training programmes. Guidance or control is not new. It was first successfully established in World War I and was associated with the names of Makins, Bowlby and Gordon-Watson. Under adverse conditions and with the desperate state of the wounded these men welded together the surgeons and their teams in depth, i.e. in the field ambulance, its receiving casualty clearing stations and hospitals. They also induced a confidence between the field and base units in the complementary nature of their work.

So, as I come to the end of our tribute on this afternoon in the spring of the year, a time full of promise in an age full of challenge, I think of the story Barrie recalls in his address on Courage. It is of the young man who was lost on a glacier. One of his companions foretold that at a certain time he would appear again. On that date the survivors, now older, returned and found him there, still young. So, each time as we gather together to do honour to Ruscoe Clarke we find him with us courageous as ever, full of energy, urging us on.

MEDICINE IN THE CONGO

Colonel E. H. P. LASSEN D.S.O., M.R.C.S., L.R.C.P.

Director of Medical Services, Ghana Defence Forces

I became Senior Medical Staff Officer at the Headquarters of the Organisation de Nations Unies au Congo at short notice from 17th July to 3rd August, 1960. This is an account of some problems I encountered. The circumstances in which U.N. troops were called into the Congo are well known; the situation was so urgent that men from the African continent were flown in without delay. There had, therefore, been no opportunity for making an operational plan, and a small cosmopolitan headquarters, hastily assembled from the U.N. Force in Gaza, was trying to establish itself in Leopoldville and assume control. Working conditions were difficult: essentials were lacking, there was no medical staff whatsoever, and A/O branch was represented by a single hard-pressed major. There were no clerks, no office equipment and indeed no offices, save for a small hotel bedroom set aside as an operations room. Unless one were a good French linguist, the telephone was likely to prove more of a liability than an asset. Transport was provided quite haphazardly by the Force Publique and later through a transport pool, but in each case one was dependent on the whim of the Congolese driver who, growing weary of waiting for the reconnaissance or conference to finish, would drive off, leaving one to make one's way back as best one could. In these circumstances troops were deployed as they flew in, and some logistic support arranged on the spot; medical arrangements except at battalion level were non-existent.

On 18th July U.N. Forces numbered some 3,000 all ranks: a battalion of Ethiopians at Stanleyville about 1,000 miles away; a battalion of Moroccans at Thysville, and two Ghanaian battalions with part of the headquarters of the Ghana Infantry Brigade located at Leopoldville. We expected a rapid build-up, and with re-inforcements from these countries and contingents from Tunisia, Sweden, Guinea, Liberia, Eire and Mali, the U.N. Force on 3rd August had some 12,000 men deployed in all the provinces of the Congo with the exception of Katanga.

All battalions arrived complete with regimental medical establishments, and included in the Ghana Infantry Brigade Group were two sections of its Field Medical Company. These apart, there were no medical units in the Force, and no arrangements had been made for hospitals or evacuation for casualties. Two things were, therefore, immediately necessary. First, the production of an outline medical plan, and second, temporary arrangements to provide some sort of medical cover until medical reinforcements could arrive.

We needed one 200-bedded general hospital, two field ambulances, two surgical teams, one forward medical equipment depot, and a medical staff headquarters consisting of a Senior Medical Staff Officer, an Assistant S.M.S.O., an Army Health

Specialist, a Medical Stores Officer, five Hygiene Assistants and five Clerical staff. This demand was cabled to U.N. Headquarters, New York, on 18th July, with a recommendation that the further medical build-up should be in accordance with British Field Force Scales. The main points of the medical plan were:—

The establishment of a 200-bedded base hospital at Leopoldville. The field ambulances with surgical teams to provide local medical cover. Long term and special cases to be evacuated by air to Leopoldville. Casualties not likely to be fit for duty within 28 days to be evacuated and Medical re-supply system to be established at Leopoldville.

Until the Field Medical Units arrived in the Congo the care of casualties would have to rest with unit Medical Officers who could call on the civilian hospitals in their areas.

Meanwhile the provision of a hospital in Leopoldville was urgent but difficult, because although most of the Belgian doctors in government employ had left the country, the hospitals were full, and the Minister of Health was, not unnaturally, concerned that the taking over of hospitals by U.N. Forces should not prejudice civilian needs. After much discussion with Ministry Officials we were allowed to use Kintambo hospital for U.N. troops: it was in a poorer part of Leopoldville and had 650 beds; it was readily divisible into two, and the Congolese staff and the one remaining Belgian doctor agreed that the civilian patients should be concentrated in one part, while the other with some 250 beds could be used by the U.N. By the afternoon of 20th July all civilian patients had been transferred, and with the agreement of Ghana Infantry Brigade, two sections of the Field Medical Company took over 50 beds for immediate use. Ghana was urgently asked for the third section and a field surgical team, and these hastily mobilized units arrived on 25th July together with three Ghanaian nursing Sisters. Thanks to this speedy Ghanaian effort a small force hospital capable of emergency surgery was established.

Meanwhile New York had reacted promptly to the request for medical units. Switzerland offered a team of civilian doctors and nurses to staff the base hospital; there were also offers of Italian and Polish medical units. The Swiss offer was immediately accepted, and an advance party of four doctors under their director, Dr. Rubli, arrived on 28th July. By early August this Swiss team had relieved the Ghanaian unit in Kintambo, and had taken over the whole hospital, caring for the needs of both civilian and U.N. patients alike. Before accepting the Italian and Polish offers, U.N.H.Q. New York was asked for more information on the composition and organization of these units, because we thought that the Force Commander should have some field force medical units that could, if required, be rapidly deployed to any troubled area, which could not be done with civilian medical teams.

A problem no less urgent than the provision of hospital cover was that of medical re-supply. Most battalions had arrived with about one month's medical supplies, but we were uncertain when the medical stores and personnel demanded on 18th July would arrive. However, a signal was received from U.N.H.Q. New York on 22nd July stating that medical supplies for 10,000 men for one month at U.N.E.F. scales were being prepared and would be despatched by sea to reach the port of Matadi by 19th September. This was too late to meet units' first anticipated demands,

but the arrangement was allowed to stand, for we had discovered a large Central Medical Government Pharmacy in Leopoldville with stocks worth nearly £1\frac{1}{2} million which was capable of supplying the needs of the whole country. Obviously it would be far more practical and economical for the U.N. Force to obtain its medical supplies from this well established and equipped depot, rather than bring in its own requirements separately. We therefore opened negotiations with the Congolese Ministry of Health. We confidently hoped that we could agree for U.N. to buy their supplies direct and so received full co-operation from the Belgian pharmacist and the Congolese assistants at the Central Pharmacy, who met small urgent demands for medical supplies at all hours. We realized, however, that when using the Central Pharmacy to meet the full demands of the U.N. Force, a separate military medical organization would be required to handle and account for them, for the existing civilian staff could not then cope. It was with great relief we met a Danish Naval quartermaster and five pharmacists and clerks at Leopoldville airport on 31st July, for their arrival averted a possible crisis over medical re-supply.

We were very lucky to have the services of Major J. W. Parsons, R.A.M.C., Assistant Director of Army Health, Ghana Defence Forces, who did invaluable work not only in this field, but also as a general medical staff officer. Later he was relieved of his duties as S.M.O., Ghana Infantry Brigade, and worked whole-time with the medical branch of U.N. Headquarters. All U.N. troops had been protected against small pox, yellow fever, the typhoid group and tetanus, and the inoculation state was remarkably high. We were also pleased to find that all troops of the U.N. Force were taking malarial prophylaxis, either Paludrine, Daraprim, Chloroquin or Darachlor. All kinds of diseases, tropical and non-tropical, are endemic in the Congo, which covers a million square miles with much variation in temperature, rainfall and topography. Both bacillary and amœbic dysentery were universally prevalent and likely to be of military significance. The mundane infectious diseases, such as measles and chicken pox, were also likely to make themselves felt, African troops being particularly susceptible to these infections. If conditions became more settled and boredom set in, venereal disease might become a major problem. Water-borne diseases would also have their effect, particularly as the standard of water discipline among the troops was very variable, and in several instances not even the medical staff had much knowledge of field sterilization of bulk water supplies. In these instances it was quite impracticable to introduce the medical officers to the mysteries of the Horrocks Box or neutral red test, and we suggested that either all drinking water should be boiled, or water sterilizing tablets, of which the Central Pharmacy had a plentiful supply, should be used.

All battalions arrived with regimental medical establishments which, in numerical strength at least, compared favourably with the higher establishment of the British infantry battalion, and included medical orderlies and hygiene assistants. Many had two and even three medical officers, but battalions varied in size and some had over 1,000 men (e.g. the Moroccan). The Swedish battalion of 600 men had two medical officers, a dental officer and a warrant officer hygiene assistant within establishment, and two specialists in internal medicine accompanied them to decide on preventive measures. That professional standards and methods varied among the different

national medical officers was only to be expected. It was clear that any attempt at standardization of treatment was impracticable; national practices must be accepted and allowed to continue. For instance the medical officer of one contingent was unqualified even in his own country's cognizances; an emergency indent from him included a demand for a dental chair, six sphygmomanometers and an electric razor, which suggests that the checking of indents at medical H.Q. is not always without value. Another unit had three medical officers within establishment; the fourth member of the team, the anæsthetist, vehemently disclaimed medical officer status.

The Medical Service established by the Belgians in the Congo was of a very high order. The hospitals were well equipped and staffed by competent government medical officers, the nursing being in the dedicated care of Belgian nuns. The public health service was equally efficient, and the most thorough and vigorous preventive measures were carried out, notably against malaria, trypanosomiasis and yellow fever. Large scale anti-mosquito measures were regularly undertaken from the air, and Leopold-ville and many other of the more important towns were free from mosquitoes. With the coming of independence, and as the political situation deteriorated, more and more Belgian doctors resigned their appointments and the medical services were left in a critical state. By the 17th July only some 200 doctors remained out of the original 450 in government service, and with the imminent withdrawal of Belgian troops it was feared that the majority of those still remaining would also leave the country.

The problem facing the Belgian doctors was twofold. First, there was the possibility of personal attack upon themselves, their families and their property, in the wave of anti-Belgian feeling that had been intensified throughout the country since independence was obtained. Second there was the question of working conditions. Many Congolese working in the Government Medical Service held a quasi-medical qualification like that of an apothecary or surgeon's mate. The Congolese were good technicians and did most useful work, but the appointments they held were subordinate to, and under the supervision and control of, the Belgian medical officers. With independence the Congolese Medical Assistants demanded recognition of full medical status, and that if Belgian doctors did remain in the service they should be allowed to act only in an advisory capacity, while the professional appointments should be given to the Congolese, with of course the corresponding salaries. It is doubtful whether this represented official government policy, but in many hospitals and laboratories the medical service was brought virtually to a standstill; and in some hospitals, however, work carried on almost normally. An outstanding example of this was seen at the Louvanium University hospital some 15 miles outside Leopoldville. The reputation of this splendidly equipped teaching hospital was above political strife, and its Belgian professional staff, under the principal, M. Gillon, and the director of medicine, Dr. Ronse, continued to work in complete harmony with their Congolese assistants. Arrangements were made for the admission of U.N. Officers and special cases to the Louvanium hospital where U.N. Forces were allocated 30 beds in the first instance, extending to 130 beds later if necessary.

On 20th July Dr. Evans of the World Health Organization arrived in Leopoldville to examine civilian medical requirements. He soon was followed by Dr. Kaul (late of the Indian Medical Service), the Deputy Secretary General from Geneva, and Dr.

Mackenzie Pollock. Very rapidly a team of medical administrators was built up. Their task was immense; it was simply to assess the situation created by the crisis and to re-form a medical service for some 13 million people. The International Red Cross also were naturally prominent in the medical relief work. Appeals were made through the United Nations for medical assistance, and the response was remarkably rapid. In a short time teams of doctors and nurses were being flown into the Congo from many different countries, and by the beginning of August six teams were at work in civilian hospitals, from Israel, Norway, Denmark, Canada, Ghana and Sweden, and there were offers of teams from ten other countries.

The civilian and military medical staffs worked in close collaboration, and it became clear that if the civilian hospitals re-organized by the U.N. through W.H.O. were made available to U.N. troops as well as to Congolese civilians, economy and efficiency would be achieved. The wide dispersion of the U.N. Force made the idea of a separate military hospital extravagant, and in view of their primary police role, unnecessary. Thus civilian teams which worked near troops would set aside a military wing. Reciprocally, the Swiss civilian team of doctors, who were obtained through military medical channels, undertook the care of civilians as well as military patients in Kintambo Hospital, Leopoldville. We later heard from New York that military medical units were extremely difficult to obtain; that Poland was unable to provide the military unit referred to earlier, and that the Italian offer turned out to be a team of mixed civilian and military medical personnel.

A NOTE ON THE ELECTROPHORESIS OF SERUM PROTEINS

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THERE are several serum proteins of definite clinical importance. Their presence and concentrations in a drop of serum may be determined by putting it on a strip of filter paper soaked in an electrolyte through which an electric current is passing. The albumen, being of lightest molecular weight, moves faster than the globulins, among which α moves further than β or γ . Nearly three years ago equipment was issued to all Command Laboratories for this electrophoretic separation of proteins. The apparatus is made by Evans Electroselenium Limited and consists of a power unit of 0 to 400 volts and 0 to 12 milliamps, a 6-strip perspex bath and a scanner. The bath contains four troughs which should be filled with buffer solution to the same level; siphoning occurs if the levels are unequal and this impairs the results. The buffer is made up with sodium barbitone 15G, sodium acetate 9.75 G., decinormal hydrochloric acid 102.5 ml. and water to 1.5 litres. Cut the filter paper strip (Whatman's No. 1) to 34 cm. and draw a pencil line across it 13 cm. from one end. Ink will be carried along by the current. The packet of filter paper is marked with an arrow indicating machine cutting, and the proteins separate best in this direction. I have found that various ways of wetting the strip with buffer and serum give widely varying results, but the following method produces reliable figures. The strip must be completely immersed in buffer so that it is saturated before it is put in the bath. A microscope slide should be cut to 4.5 cm., half a cm. less than the width of the strip. Hold this slide vertically and pipette 0.05 ml. of serum evenly along its lower edge. Lightly blot the starting line on the strip and gently press the edge of the slide at right angles onto it for 20 to 30 seconds. Cover the bath and leave it for fifteen minutes so that the serum is evenly absorbed into the strip.

We use a current of 1.5 ma./strip for 22-24 hours. This moves the albumen band 11 or 12 cm. The strips are dried at 100 to 105 C. for 15 minutes, loosely coiled and immersed in bromphenol for 20 minutes. The dye solution is of 0.25 per cent bromphenol blue in alcohol saturated with mercuric chloride. Washing the strips in a bowl of tap water for about a minute removes any excess dye, and they are then put in two baths of 2 per cent acetic acid for three and two minutes; after three minutes in a solution of 2 per cent acetic acid in 1 per cent sodium acetate, they are lightly blotted with a clean towel and dried in an oven. When dry they are immersed in equal parts of acetone and ether for one or two minutes and hung up to dry at room temperature. The dye used in this staining is absorbed in proportion to the amount of protein present, as, of course, is essential with a scanner which estimates the proteins by direct photometry. Other dyes are equally suitable and I have found that Light Green gives just as good results.

The dry strips are immersed in 0.25 per cent Light Green (G. T. Gurr) in 10 per cent sulphosalicylic acid for 20 minutes. The strips are washed with 2 per cent acetic acid three times for five minutes each, and then dried at 100 C. for ten minutes. The proteins are then seen as green bands against white, so that a pale red filter should be used in the scanner.

The stained paper is made transparent by immersion in a liquid with the same refractive index as paper, such as benzyl alcohol. This liquid must completely penetrate the paper, because any air bubbles left in the strip give false readings by altering transparency. The strip is cut to the size of the scanner frame and immersed in the alcohol at about 70 C. Any excess is drained off the strip, which is blotted with clean filter paper, sandwiched between two plates of optical glass and inserted in the scanner frame. Scanning is best done by "zeroing" just in front of the albumen band, then moving the frame one scale division at a time and marking the readings on graph paper. This method easily detects small dips and peaks. For bromphenol blue the green filter supplied with the instrument is satisfactory.

I am indebted to Colonel J. L. Gordon, O.B.E., D.P.H. and Major S. Elliott, O.B.E., T.D., B.Sc., F.R.I.C., for encouragement and advice.

BOOK REVIEWS

The Appin Murder, The Trial of James Stewart, a new survey of a historic mystery by Lieutenant-General Sir William MacArthur, K.C.B., D.S.O., O.B.E., D.Sc., M.D., F.R.C.P. (London and Ireland), D.P.H., D.T.M. & H. London: J.M.P. Publishing Services, 1960. Pp. 118. Illustrated. 10s. 6d.

Although it seems an impertinence to begin a review of this fascinating book by introducing its distinguished author, it is a shock to realize that to many junior officers he may well be better known as the President of the Royal Society of Tropical Medicine and a lecturer in Oxford University, than as a former D.G.A.M.S., and one of the most inspiring lecturers who ever stirred young R.A.M.C. officers to high endeavour in the professional life of our Corps. His subject, the Appin Murder, needs no introduction to most Scotsmen—it is part of our national historical heritage. When, as a boy, I stayed in Invernahyle House in Appin it would have been as unthinkable for any gillie or farmer to be without a personal opinion on this ancient mystery as for his counterpart today to be

without a theory about the Loch Ness Monster.

James of the Glen does not need the advocacy of any Professor from the Home of Lost Causes. His innocence of complicity in the crime for which he was hanged has been universally accepted for generations. But it is a much more difficult matter to determine who was, or were, guilty, and Sir William MacArthur, who has for many years been an acknowledged authority on this subject, gives us the benefit of his deep and original researches in an enthralling and scholarly historical essay. He does not accept the facile theory that it was all just an affair of "political necessities and clan hatred"; and the somewhat flamboyant kind of pseudo-Highlander who likes to lay the guilt of every old sad tragedy on the Campbell doorstep may be disappointed to find that MacCailein Mor, though not entirely whitewashed, is not cast in the part of First Murderer, whatever Robert Louis Stevenson may have been pleased to say in order to spin a good tale. Could it have been the Camerons after all? If "the Sergeant More" fired the shot he was not the last soldier on leave to commit a crime and to escape to secure anonymity with his regiment overseas. We learn that Alan Breac (pockmarked, not freckled) was no gay Robin Hood any more than poor Glenure was an oppressive, crafty "Red Fox." Scotsmen, whatever their heads may tell them, tend to be Jacobites with their hearts, at any rate in their youth. Deeper acquaintance with contemporary opinions of "Bonny Prince Charlie," a music-hall title more commonly used by the English than by the Scots, and such books as *The Jacobite* General by Katherine Tomasson show the Prince as a rather unsatisfactory character, and compet the sad admission that thousands of his once devoted followers probably hoped for a negative answer to the cry, "Will ye no' come back again?" It is really rather pleasing to learn from General MacArthur that he did—"There seems to be no doubt that Prince Charles was in London in the summer of 1750. when he is said to have visited the Tower and decided that it would be easy to blow in one of the gates. So he had "guts" after all.

Those who remember the author's glowing determination that in Tropical Medicine we should learn "the truth, the whole truth, and nothing but the truth" will not be surprised to see the same zeal to share with us the results of his detective activities and research into the Appin Murder; zeal which has caused him to insist that his book though elegantly produced should not be expensive. It

is unusually good value for half a guinea.

A Short Synopsis of Human Protozoology and Helminthology. L. R. S. MACFARLANE, O.B.E., M.D., M.A., D.P.H. London: E. & S. Livingstone, Ltd. 1960. Pp. 234. 35s.

A well-produced and well-illustrated book on human parasitology which should be of value to D.T.M. & H. students. It is particularly pleasing to find a glossary giving the Greek and Latin derivations of technical terms. All synopses suffer from compression and some facts have to be left out. However, it is considered that other causes of the clinical condition "Creeping eruption" than members of the super-family Strongyloides might have been mentioned. D. W. B.

Surgery of Repair as Applied to Hand Injuries. 2nd Edition. B. K. RANK, C.M.G., M.S., F.R.C.S., F.R.A.C.S. and A. R. WAKEFIELD, M.S., F.R.C.S., F.R.A.C.S. London: E. & S. Livingstone Ltd. 1960. Pp. 284, 45s.

Antibiotics have probably been a major factor in the reduction of hand sepsis and the emphasis in hand surgery has now correctly shifted to the preservation and restoration of hand function. This evolution has been most ably served by the authors of this treatise. While an immense amount of care was put into the preparation of the first edition, this new edition has been significantly improved. The main strength of the book lies in its attractive layout and instructive description of the assessment and primary surgery of the injured hand including burns. Their statement that this interesting and practical book, "is meant primarily for the discriminating interest of those who see and treat hand injuries," can be heartily endorsed. It will be of particular value to Casualty Officers and Registrars. while those with plastic and orthopædic ambitions will find the chapters on tendon and nerve repair and other plastic procedures of great value. The chapter on hand injuries in children is greatly to be commended. The binding is tasteful and while the photographs are, on the whole, excellent, some suffer from being too small; for example, Fig 24 shows instruments for hand surgery but they are too small to be clearly identified. The book is far too heavy to carry and hold: on this account it is in danger of being relegated to the Reference Library, a fate it ill deserves, for it should be in the possession of all who seek guidance and instruction in the art of reparative hand surgery. J. M. M.

The Operation of Sterilizing Autoclaves. A Symposium held at Brighton Technical College School of Pharmacy. London: The Pharmaceutical Press. 1959. Pp. 45. 7s. 6d.

This most interesting report deals with the physics of sterilization, design and testing of the sterilizer and the use of equipment and staff responsibilities, each section contributed by an expert. It is most informative and should be of the greatest interest and use to all who deal with sterilization of dressings and instruments.

P. J. L. C.

Antibiotic and Sulphonamide Treatment. A Short Guide for Practitioners. Edited by M. E. FLOREY, M.D. London: Oxford University Press. 1959. Pp. 150+ix. 10s. 6d.

The appearance of this small handbook is opportune; the latest information on all aspects of chemotherapy is available here in readily accessible form: it can be confidently recommended to all Medical Officers.

W. R. M. D.

Note on the Treponematoses with an illustrated account of Yaws. L. H. TURNER. Bulletin No. 9 from the Institute for Medical Research, Federation of Malaya. 1960. Pp. 278. \$9 Malayan In this full and easily read account of the treponematoses, Hudson's unitarian conception of these

In this full and easily read account of the treponematoses, Hudson's unitarian conception of these conditions is sympathetically reviewed. Sporadic (venereal) syphilis is contrasted with endemic (non-venereal) syphilis. Poverty is a pre-requisite for endemic treponematoses, which once extended to Scotland as sibbens, and Ireland as button-scurvy. There is a full and very clear chapter concerning the serology of these diseases, which is of particular value as so many practising physicians tend to be ignorant of this subject. Classification of the yaws lesions into primary, secondary and tertiary stages is preferred to the W.H.O. classification into early and late lesions, on the grounds that it is the pathological and clinical features rather than the time of occurrence which should be the determining factors. There is a comprehensive treatment of plantar yaws which is of great military significance; in particular, the hyperkeratosis which may arise in the soles of the unshod in the tropics without treponemal infection is well described and illustrated. The importance in backward areas of single-dose treatment by injection is stressed, and the long-acting penicillins lend themselves to this. The writing is clear and the diagrams, unlike so many in current journals, are of real assistance. There is an excellent set of photographs to illustrate each yaws lesion. The author has seen an enormous amount of yaws in the field; the approach is practical and clinical. It is perhaps too long for the average student, but would be an invaluable addition to the library of every military hospital in the tropics.

W. O'B.

Cholera. R. POLLITZER. World Health Organization. 1960. Available from H.M. Stationery Office, P.O. Box 569, London, S.E.1. Pp. 1,019. Clothbound edition £5.

This is a monumental work and contains practically everything of consequence that has been written about cholera. It should have the stamp of authority. Opinions of other writers are given too much prominence and one wishes the references and quotations were more eclectic. The voice of the author is sometimes lost in the monotonous drone from the past and one feels that in a work of this sort the opinions of the author on controversial matters should be incisively expressed. There is, too, a certain lack of balance and the practical physician will no doubt feel aggrieved that, in a work of over 1,000 pages, the symptomatology, diagnosis, prognosis and treatment of cholera is dismissed in a mere 123 pages. Moreover he will search in vain for any reference to steroid therapy—surely cholera offers a field for its employment? Dr. Pollitzer's industry has been truly amazing. He has had much experience of cholera and plague. Indeed his monograph on the latter disease published by W.H.O. in 1954 is already a classic. One feels sure that this companion work is worthy of similar distinction.

R. J. G. M.

Preventative Medicine in World War II. Vol. IV: Communicable Diseases. Washington D.C.: Office of the Surgeon General, Department of the Army. 1958. Pp. 544 + xxi. \$5.50.

This most interesting book has been written by 21 medical men. It draws attention to several matters which need to be repeatedly stressed in the piping days of peace lest forgetfulness and ignorance lead to yet more casualties of carelessness. Much of what is written has a familiar ring to all who have studied the hygiene lessons learned at so great a cost in past wars. The fact that, even in World War II, disease ranked first among the causes of military manpower wastage; the fact that proper indoctrination of Commanders and troops is so vitally important; comparable books and papers are published after every war. This book deals in detail with communicable diseases, spread through the respiratory and alimentary tracts. One is again impressed by the military importance of bacillary dysentery and upper respiratory infections. Bacillary dysentery still wins wars or loses them; memories of Agincourt were echoed at El Alamein, although with different outcomes. The Internationally Quarantinable Diseases did not seriously embarrass the U.S. Army Commanders. 402 cases with 32 deaths was not very much compared with the total of 3,167,326 cases with 3,742 deaths from all infections and parasitic diseases. All who need to study the medical history of World War II

will find this a valuable book. One section is headed "Achievements and Challenges"; it omits the greatest challenge of all, and that is to persuade all military Commanders and leaders to translate the hygiene lessons of World War II into executive action, which can be implemented without fail in future wars.

M. M. L.

The British Pharmaceutical Codex. 7th Edition. London: The Council of the Pharmaceutical Society of Great Britain. 1959. Pp. 1301. 70s.

This quinquennial publication has been extensively revised and numerous new monographs have been added. Its place as a source of concise information on drugs in common use throughout the British Commonwealth, and in the provision of standards for drugs not included in the British Pharmacopæia, is amply maintained. The combination of a very full index with the alphabetical arrangement of the subject matter within each of the six parts is particularly satisfactory in a work in which ease of reference is of prime importance. Part 1, which deals with general monographs on drugs in common use, occupies two thirds of the total text, and it is suggested that an alphabetical thumb index to this part would further facilitate rapid reference. On the whole, the individual monographs are excellent and up-to-date summaries of agreed modern practice. In certain instances their laudable conciseness has, possibly inevitably led to a certain dogmatism. For example, the account of the action and uses of Bemegride on p. 76 hardly reflects the widely varying results claimed for the use of this drug in barbiturate poisoning. The reference on p. 181 to the possible occurrence of "minor" degrees of jaundice as a result of administration of chlorpromazine would seem to be an understatement of this toxic effect. Reference on p. 453 to the use of ammonium chloride to enhance the duiretic effect of mersalyl does not suggest that many practitioners do not consider that this effect is worth the nausea which this salt produces. Few drugs of proved usefulness are omitted. It is surprising that tri-iodothyronine, probably the drug of choice in the treatment of myxædema. has not been included. These are, however, minor points in an excellent publication which fully maintains the high standard of its predecessors. R. A. M.

Surgery in World War II. Neurosurgery. Volume I. Edited by R. GLEN SPURLING, M.D. and BARNES WOODHALL, M.D. Washington D.C.: U.S. Government Printing Office. 1959. Pp. 428+1vi. \$5.00.

Pp. 428+lvi. \$5.00.

One of the features of the Army Medical Service of the last war was the development of specialist units. Since the war, studies on the value of such units and their integration into the general plan have continued. They pose particular problems of administration and training. In this volume from the medical department of the U.S. Army the history of neurosurgery in World War II is considered. It covers head injuries and a companion volume on injuries of the spinal cord and of the peripheral nerves is promised. Readers of the Journal should find this volume of particular interest, for rarely have the administrative problems in war been so fully set out and discussed. The articles were written just after the end of the War by surgeons who had served in the various overseas theatres and there is much here to interest the administrator and the teacher as well as the neurosurgeon. In the initial period the Americans arranged neurosurgical facilities at their evacuation hospitals and the development of main neurosurgical centres came later. The advantages of concentrating specialized neurosurgical personnel to special areas, as the battle dictated, by a mobile system became apparent with increasing experience. The difficulties of organization are well illustrated, particularly in the chapter on the Mediterranean theatre and for example, the experience at Bizerta. The shortage of staff, the difficulties of communication and the unexpected postings are all here and strike familiar notes. But also in this book is described the solid achievement of an almost incredible expansion of a specialist service which by the end of the war could demand over 21,000 beds in the United States alone and a ratio of one neurosurgeon to every 237 patients. The authors are generous in their appreciation of the R.A.M.C. contribution. Its concept of the mobile neurosurgical unit, the exchange system between base and forward surgeons, the development of the portable neurosurgical operating table, and other points, are all mentioned. To those interested in the clinical aspects of head trauma there are excellent chapters on the routine management of missile wounds, special injuries such as blast concussion, and sequelæ such as epilepsy, cranial defects and infection, all well illustrated and produced. The lessons of war are soon forgotten, but here at last is a record and a guide for the future. Those who have responsibility for future planning will be heavily indebted to the sponsors of this volume who had the foresight to see that such a book was needed and succeeded in carrying their project forward.

Brucella Infection and Undulant Fever in Man. SIR WELDON DALRYMPLE-CHAMPNEYS. London: Oxford University Press. 1960. Pp. 157+xii. 25s.

This is an excellent little book by a well-known authority. It is engagingly and simply written. The author has a feeling for the history of the subject. The frontispiece is a photograph of Assistant Surgeon J. A. Marston of the Royal Artillery who first described Mediterranean fever as a separate disease in 1859. The original is in the Royal Army Medical College Library. There are also photographs of Surgeon Major M. L. Hughes, Sir William Horrocks and Sir David and Lady Bruce. In this book the part played by Lady Bruce in her husband's work, so often unrecognized, is acknowledged. The criteria for the diagnosis of undulant fever are often hotly debated. The rational outlook

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and the balanced view of the author are brought to bear on this subject in Chapter 8—and there is a most useful summary at the end. The subject of chronic brucellosis is another bone of contention and the book provides a helpful discussion in an unprejudiced manner. With respect to treatment Sir Weldon supports the findings of the Joint F.A.O./W.H.O. Expert Committee on brucellosis (1958). The tetracyclines are more advantageous than the combination of sulphonamides and streptomycin. For the more severe infections, and for all infections due to Br. suis, a combination of tetracyclines and streptomycin for a period of 21 days is recommended. This book has been a pleasure to read. There are 385 references, an index of authors and an index of subjects. R. J. G. M.

Tabulating Equipment and Army Medical Statistics. BRIGADIER-GENERAL ALBERT G. LOVE, U.S.A. (Ret.), COLONEL EUGENE L. HAMILTON, M.S.C., U.S.A.R., and IDA LEVIN HELLMAN, M.Sc. Washington D.C.: Office of the Surgeon General, Department of the Army. 1958. Pp. 202+x. Illustrated. \$2.00.

1958. Pp. 202+x. Illustrated. \$2.00. This monograph is a mainly historical account of the establishment of the Medical Statistics Division of the Surgeon General's Office of the United States Army. The senior author is well known for his massive volume on Army Anthropology in the First World War, with C. B. Davenport, and for later studies on somatological norms in disease, some in collaboration with L. J. Reed who contributes a preface to the present work. The book begins with an account of the different Surgeons General in the century before the First World War, and traces the growth of a reporting system from the first health reports in 1818 to a system of returns and individual records rather like that used by the Army in this country. Then follows the central section of the book, which is concerned with the First World War and data collected at that time and since analysed. It describes the successful introduction of Hollerith punched card equipment and the medical records which were processed. A point of interest was the adoption in a modified form of the British Field medical card, which had the force of three years' experience to recommend it. The senior author's personal recollections go back to this period and before. He was to continue with the statistics organization for much of the time until 1932. A brief account is given of the results of the anthropometrical and other analyses, which have been published elsewhere, based on the physical examination of Selective Service registrants. Other material went back a very long time indeed even before the War, and enabled a long term follow up to be achieved which must surely be unique. The published results in "Human Biology" have become justly famous. The last section of the book covers the period from 1932-57 and discusses the mechanics of collecting and servicing morbidity data very thoroughly. The necessity is stressed for a good basis of registrars and clerks at the hospitals. S. R.

British National Formulary 1960. Alternative Edition. The Pharmaceutical Press and British Medical Association. 1960. Pp. 292. 8s.

The reappearance of an up-to-date edition of this valuable reference work is welcome. All medical officers will find this text, which is based on a pharmacological classification, indispensable to their daily work. The glossary and list of equivalent preparations are among the features which add to its usefulness.

W. R. M. D.

Blindness in West Africa. F. C. RODGERS, M.D., Ch.M., D.O.M.S. London: H. K. Lewis & Co. Ltd. 1959. Pp. 262+xiv. £3 10s.

This survey of the blindness in West Africa would well repay study by any medical officer expecting to serve in this area. The problems dealt with are enormous and far reaching and cannot fail to interest anyone concerned in the health of the population, whether as a whole or in the sphere of military medical practice. The book is written in clear and concise language, and the absence of unnecessary technical terms makes it a pleasure to read. Part I deals with the geographical and sociological aspects of the areas surveyed, and is illustrated by excellent photographs of the country and its inhabitants. There follows a detailed survey of blindness in West Africa. Part II is devoted mainly to onchocerciasis and gives a clear clinical picture of this disease, which is a cause of so much ocular disability among Africans. The book is profusely illustrated with excellent photographs and with numerous maps and diagrams. In the geographical section there appears to be some confusion between east and west, and between longitude and latitude, and on p. 130 hemeralopia is used to designate night-blindness. However these defects in no way detract from the value of the report which goes far to clarify our knowledge of ocular disease in West Africa.

J. B. G.

Biochemical Values in Clinical Medicine. R. D. EASTHAM, B.A., M.D., D.C.P., D.I.P. (Path.) Bristol: John Wright & Sons. 1960. Pp. 144. 15s.

The author has stated in his Preface that he has tried to provide an accurate summary of the ways in which various conditions affect many biochemical tests. This he has accomplished in a book which fits snugly into the coat pocket. Tests are arranged in alphabetical order and under each heading are given the normal range followed by physiological and pathological variations. A major reference is given for the majority of the tests mentioned. A few minor misprints are present such as the equivalent weight of calcium being given as 2.0 G., and one cannot agree with the author when he states that, "There does not seem to be any special indication for serum pseudocholinesterase estimations which are technically difficult." Several tests have been included which the author himself considers of

debatable value. These have presumably been included to make the book as complete as possible, but might well have been omitted. In spite of these minor criticisms, I consider that this small book will fulfil a need and will be extremely useful to Students, Physicians and Clinical Pathologists. The price, however, appears rather high for a small paper-backed book, likely to be subjected to considerable wear and tear.

T. E. F.

Bedside Diagnosis. CHARLES SEWARD, M.D., F.R.C.P. (Edin.). Edinburgh and London: E. & S. Livingstone, Ltd. 1960. Pp. 464+xix. 25s.

This clinical handbook deals with the causes of common presenting symptoms. Associated physical signs and accessory methods of diagnosis are clearly outlined and the book has won well-deserved popularity. The latest edition has been thoroughly revised and brought well up to date. There are valuable new sections on the use of radio-active isotopes and on drugs as causes of symptoms.

W. H. H.

Peptic Ulceration. CHARLES WELLS and JAMES KYLE, M.B., F.R.C.S., F.R.C.S.(I). Edinburgh and London: E. & S. Livingstone, Ltd. 1960. Pp. 260+xi. 42s.

This publication is styled "A Symposium for Surgeons" and presents in concise form a well selected survey of the current knowledge and practice in the management of peptic ulceration. In his foreword, Dr. Lester Dragstedt reaffirms his conviction that hypersecretion of gastric juice is sufficient cause for most chronic progressive ulcers, and that it is of nervous origin in duodenal ulcers and of humoral origin in gastric ulcers. In his preface Professor Wells modestly refers to the exclusion of detail in technique and routine diagnosis: this has allowed the contributors (all of whom have an association with the Liverpool School) full scope in emphasizing many recent advances. Among the chapters of a high standard are those by Sircus on ætiology, by Winston Evans on pathology, and by Professor Wells, who offers sound advice on the choice of operative procedure and in the management of the technical difficulties that can arise. Professor Welbourn's chapters on alimentary function and the post-gastrectomy syndromes repay close study. A novel feature is the Appendix with translations of early German papers on gastric surgery. This well-produced book is a significant contribution to surgical literature and will give post-graduate students and general surgeons an excellent perspective in this absorbing field of surgery.

J. M. M.

The Principles and Practice of Medicine. 5th Edition. Edited by SIR STANLEY DAVIDSON, M.D., F.R.C.P.(Edin.), F.R.C.P., F.R.S.(Edin.). Edinburgh: E. & S. Livingstone Ltd. 1960. Pp. 1,112+xi. 35s.

This book deserves nothing but praise not only for the careful selection of its contents but also for its clear and concise description of disease. That in eight years it has now reached five editions and four large reprints is a reflection of its popularity among students and doctors. W. R. M. D.

Manual of Surgery (Rose & Carless). 19th Edition. SIR CECIL WAKELEY, Bt., K.B.E., C.B., LL.D., M.Ch., D.Sc., F.R.C.S., F.R.S.E., F.A.C.S., F.R.A.C.S., MICHAEL HARMER, M.A., M.B., B.Chir. (Cantab.), F.R.C.S. and SELWYN TAYLOR, M.A., D.M., M.Ch.(Oxon), F.R.C.S. London: Baillière, Tindall & Cox. 1960. Pp. 1,389+xv. 84s.

First published in 1898, Rose and Carless has since been translated into Hungarian, Chinese and Arabic and there have been special Chinese and numerous American Editions. Eight years have elapsed since the last edition. The editors have therefore had to rewrite completely and add new sections to maintain the world-wide reputation of this work. New chapters on the Surgery of Malignant Disease, Endocrine Surgery and Pædiatric Surgery have been added, and as sections on Orthopædic Surgery, Otorhinolaryngology, Ophthalmology and Tropical Surgery are already included, Rose and Carless is indeed a complete and comprehensive text book of surgery for the undergraduate student. Great care has been taken by the printers: the paper is semi-gloss and only two printing errors stand out (Pp. 65 and 424). The quality of the numerous illustrations is generally good and they clearly show what is intended. Generally the contents are right up-to-date, well laid out and very easy to read. Bold type headings and liberal use of italics obviate the necessity of underlining for subsequent revision work, but it is unfortunate that the style of the orthopædic section is in places somewhat ponderous and in parts even misleading; for example, in discussing deformities of the hand, phalanges instead of joints are described as being flexed or extended. The Editors may rest assured that the 19th Edition is well worthy of its famous predecessors. Indeed such is the quality of many of the sections that, although primarily written for the undergraduate, to whom this work is strongly recommended, the Manual will also be of value to post-graduates who wish to keep up to date with the basic principles of Modern Surgery in all its aspects. W. J. P.

The Pharmaceutical Pocket Book 1960. 17th Edition. London: The Pharmaceutical Press. 1960. Pp. 575 and xii. 30s.

This reference work contains a wealth of information on chemistry and pharmacy applied to medical and veterinary practice. It is especially useful in providing details concerning the new drugs which continue to be introduced year by year. Though written primarily for the pharmacist, its perusal can be recommended strongly to medical officers.

W. R. M. D.



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The Principles and Practice of Chiropody. 2nd Edition. JOHN H. HANBY, F.Ch.S. and H. E. WALKER, F.Ch.S. London: Baillière Tindall & Cox. 1960. Pp. 433+xii. 30s.

The lay-out and illustration of this book is excellent. There are good sections on Anatomy and Function of the Foot. It is cheering to see so much space given to a clear description of that important and much-neglected structure—the skin. The chapters on corns and callosities should be of interest, not only to chiropodists, but also to orthopædic surgeons. I feel that a little more space could be given to the place offered by surgery in the treatment of the foot. Such manœuvres as flexor to extensor tendon transplant, hydrocortisone injection for plantar fasciitis and Keller's operation amongst others deserve prominence. Chiropodists should be in a position to know at what point the orthopædic surgeon can help. The chapter on Surgical Conditions is disappointing. Are ankle dislocations left in plaster for only two weeks? Do we still believe in Sever's Disease? Surely the X-ray in Fig. 129 is now considered to be normal? The general surgeons, I believe, still teach that ganglia arise from synovial sheaths—surely they always come from capsule or ligament? Too little attention usually is paid to shoes and footwear and the views on these are welcome. This new edition will be welcomed by students and practitioners of chiropody; it should be read by R.M.O.'s and used in the training of their foot orderlies.

Nitrous Oxide in Dentistry. Its Dangers and Alternatives. J. G. BOURNE, M.A., M.D.(Cantab.), F.F.A.R.C.S. London: Lloyd-Luke (Medical Books) Ltd. 1960. Pp. 181+vii. 30s.

There is general agreement to-day that the use of nitrous oxide for patients in the dental chair

There is general agreement to-day that the use of nitrous oxide for patients in the dental chair often leaves much to be desired and is not commensurate with the safe and tranquil anæsthesia provided by modern techniques in the operating theatre. Dr. Bourne has been actively interested in this problem since 1947, and in this short monograph sets out the reasons for the failure of nitrous oxide with great lucidity. He stresses the dangers inherent in the inhalation of nitrous oxide, as a sole anæsthetic agent, in the sitting position, with special reference to the serious hazard of fainting. From this wide practical experience and extensive clinical trials and laboratory studies, Dr. Bourne concludes that cyclopropane has many advantages over nitrous oxide for this purpose, and describes in detail examples of simple compact apparatus designed for its safe administration in a non-explosive mixture with nitrogen and oxygen. This book will be read with interest by dental surgeons and anæsthetists alike, and although all may not agree with the author's conclusions, they will find it difficult to refute his arguments. Dental surgeons in particular will surely welcome this "fresh approach to the whole problem of general anæsthesia in ambulatory patients, with special reference to dentistry" by such eminent authority. This is a notable contribution to the literature on the subject, and is of particular interest to Army anæsthetists in providing the background to the development of highly portable apparatus of considerable potential value for the short anæsthesia of mass casualties, and for dental and minor anæsthesia in the field or under other conditions in which elaborate apparatus and medical gas cylinders are not available.

D. V. T. & K. F. S.

Calendar of the Pharmaceutical Society of Great Britain 1960-61. London: The Pharmaceutical Press. 1960. Pp. 306. £1.

An official publication of the Pharmaceutical Society, which gives detailed information on the development and functions of the Society, including administration, activities, education and legal information. The Statutes and Regulations, which comprise about half the book, include complete details of the Pharmacy and Poisons Acts, The Poisons List, The Poisons Rules, the 17 Schedules to the Rules, The Dangerous Drugs Acts, The Therapeutic Substances Act and various regulations dealing with the control, sale and supply of Therapeutic Substances. The book is a comprehensive and authoritative reference for those concerned with Pharmacy.

C. K.

Surgical Philosophy in Mass Casualty Management. WARNER F. BOWERS, A.B., B.Sc., M.D., M.S., Ph.D. and CARL W. HUGHES, A.B., M.D. Oxford: Blackwell Scientific Publications Ltd. 1960. Pp. 197 + ix. 54s.

This is a realistic and necessarily brutal appreciation of the problems of Mass Casualty Management. The authors state that the aim should be to save as many lives and limbs as possible with the facilities available, doing nothing more than the bare minimum to accomplish this. This is logical and acceptable to those with experience of war-time surgery or major civilian disasters, but so far removed from peace-time hospital concepts that it is well worth stating. The capabilities and limitations of the layman are discussed, and it is pointed out that he should not be expected to perform functions requiring medical judgment, such as tracheotomy. The tourniquet, it is suggested, should be used only as a physiological amputation to be completed later. This may seem drastic, but how often are tourniquets ineffective and dangerous even when applied by the medically qualified. The authors advocate the use of local and regional block anæsthesia by paramedical personnel such as nurses and dentists since the service of the skilled anæsthetist may not be available for inhalation anæsthesia. Many might argue that the technique of regional anæsthesia is the more difficult to master. The chapters on civilian disasters and casualty exercises demonstrate only too clearly the difference between the real thing and simulation. A relatively small number of seriously injured patients will completely disrupt the average hospital organization unless there is prior planning and practice. This is a workmanlike and stimulating book with sufficient fact for those of us who are tired of so much theory.

Dental Practitioner Formulary 1960. London: Pharmaceutical Press. 1960. Pp. 54. 3s. 6d.

This small and inexpensive booklet, based on the British National Formulary, is an excellent guide to therapeutics in dental practice, particularly to those prescribing under the National Health Service Regulations. This latest edition has been considerably re-phrased and brought up to date as regards the addition of new drugs and the deletion of remedies now discarded, and includes the recent amendments to the lists of Prescribed Drugs under the National Health Service (General Dental Services) Amendment Regulations 1960. In particular, the much criticized paragraph under Control of Infection in the Notes for Prescribers has been completely re-written to good effect. Generally speaking this is an improved version of the 1957 edition, and merits a place in every dental surgery.

D. V. T.

Surgery and Clinical Pathology in the Tropics. CHARLES BOWESMAN, O.B.E., B.A., M.D. F.R.C.S.E., F.A.C.S., D.T.M. & H. Edinburgh: E. & S. Livingstone. 1960. Pp. 1,050+vii. £5 10s. In the preface to his book the author describes how he kept a Medical Scrap Book for 25 years, and has now compiled this work; he describes it as a series of essays on situations and subjects as they occur in clinical practice. He says this method predisposes to repetition, but hopes that it has the advantage of making for easy and leisurely reading. Unfortunately, his rather Jingle-like style of stringing together numbers of short and disconnected sentences does not make for easy reading, and the length of the book is rather daunting. In an endeavour to be comprehensive, the author-in addition to giving his own work—constantly quotes other authorities with the proviso that he has no personal experience of their methods, and also indulges in some rather speculative thinking which leads him to a number of bizarre hypotheses. One learns with interest that the laryngeal spasm of hydrophobia is associated with a low calcium level which gives this spasm; that starch is an excellent hæmostatic; that hydrocortizone is a very stimulant drug in peritonitis; that left-sided salpingitis is due to varicoccele of the ovary; that paralytic ileus is due to excess of cholinesterase in the gut which can be counteracted by administering diisopropyl fluorophosphonate; that venereal diseases are not necessarily associated with sexual relations; that rectal saline is superior to intravenous saline in the treatment of dehydration with the advantage that it can be supplemented by milk or thin soup Although there are some valuable tips on the management of surgical conditions in the tropics scattered throughout the book, much that is written in it is misleading and out of date and it is felt that the author would have done better to concentrate on those particular aspects of surgery relevant to the tropics, rather than attempt to cover the whole field of surgery. To those who may have wondered why books on tropical diseases are so often written by London teachers rather than by workers in the tropics, this book provides a ready explanation.

Antibiotics and Sulphonamides in Ophthalmology. ARNOLD SORSBY, M.D., F.R.C.S. and JOSEPH UNGAR, M.D., D.C.P., New York and Toronto: Oxford University Press. 1960. Pp. 111-ix. 12s. 6d.

This little book gives an up-to-date survey of the pharmacology and therapeutics of the antibiotics and sulphonamides as used in ophthalmology. It is divided into three parts, Part I being a brief but useful survey of inflammation, infection, and the basic principles of treatment. The protective defensive and reparative nature of inflammation is stressed, and where infection is the cause, the importance of establishing the nature of the infecting agent on both clinical and bacteriological grounds is made clear. Part II deals with the pharmacology and therapeutics of the sulphonamides and antibiotics, while Part III deals with specific therapy and covers the infective and inflammatory conditions commonly met with in ophthalmic practice. The book questions the use of these agents in minor infections of the outer eye and caution is advised in the use of steroids in the presence of infection, when suppression of the inflammatory reaction may be unwise. This is a most useful book which gives a great deal of sound advice in a small space, and is well worth the moderate price.

J. B. G.

Pocket Prescriber. 17th Edition. ALISTAIR G. CRUIKSHANK, F.R.C.P.(Edin.). Edinburgh: E. & S. Livingstone. 1960. Pp. 307 + vii. 6s.

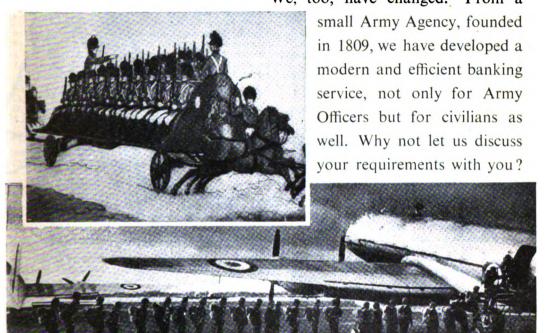
Once again this collection of valuable data has been brought up to date and is available for ready reference in pocket form. The inclusion of proprietary drugs in the section on Modern Remedies makes the book especially useful to the busy practitioner.

W. R. M. D.

Malaysian Parasites, XXXV-XLIX. Edited by W. W. MACDONALD. Institute for Medical Research, Kuala Lumpur, Federation of Malaya: Government Press. 1960. Pp. 251+vii. Illustrated. £1 Is. In the young countries of the tropics, there are still many pitfalls of endemic disease awaiting those who would develop these lands. Scrub typhus, conveyed by the parasitic larvæ of chigger mites (Trombicula) in the Far East, is an example of such a pitfall, which suddenly yawned during the last war. Today the "Arbor" viruses, transmitted by mosquitoes, mites and ticks are showing themselves to be ever more important and widespread as our knowledge of them grows. Unfortunately, all attempts to study endemic arthropod-borne diseases in these countries, have exposed a serious ignorance of the disease vectors and their natural hosts, so that, if preparation against the unknown difficulties of the future is to be made, it is essential to gather in advance, as much information as

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possible about native arthropods and their associations. It is therefore most pleasing to receive another volume of Malaysian Parasites, XXXV-XLIX from the Institute for Medical Research, Federation of Malaya, which is carrying out just such a long-term survey, and, what is very important, publishing individual papers in relevant volumes to aid easy reference. The material in these studies is extremely valuable, but often for the specialist only. For instance, the "means" and "symbols" used in the identification of chigger mite species can only be appreciated by a dyed-in-the-wool acarologist with his "micrometer eye-piece." It is, however, the patient compilation of knowledge such as these keys with their detailed diagrams that will enable the endemic diseases of the future to be controlled.

Some studies, though, are very readable to the non-specialist. The notes on rearing Malayan ixodid ticks are full of interesting data which are easy to understand. For those who have suffered the attachment of blood-sucking ticks, it may give satisfaction to read that an Amblyomma geamyda adult was kept alive without a blood meal for 315 days (though this does not compare with Nuttall's Ixodes ricinus which he starved for 27 months). Another interesting chapter is on the "Host distribution of Malayan ticks," where such curiosities are recorded as hard ticks (e.g., Amblyomma nitidum) infesting sea snakes (Laticauda colubrina, an amphibious sea-snake). In conclusion, it should be recorded that this rich fund of information on horse flies (Tabanidæ), mosquitoes including Armigeres (Culicidæ), harvest or chigger mites (Trombiculidæ), mongoose mites (Cheyletidæ), porcupine mites (Dermanyssidæ), house rat internal parasites (Mematoda), and Ticks (Ixodidæ), is the result of collaboration by Malayan British, American and Australian workers, who are unostentatiously helping to lay a sound foundation of health for future generations in Malaysia.

Disc Lesions and other Intervertebral Derangements. E. J. CRISP, M.D. (Cantab.), D.Phys. Med. (Lond.), F.R.C.S. Edinburgh and London: E. & S. Livingstone. 1960. Pp. 156+viii. 15s. This is a most useful book for all those called upon to treat patients suffering from "pain" in the back.

The 156 pages are full of useful information, well and clearly illustrated. It is easy to read. The author has a sound knowledge of his subject and has put his vast experience at the reader's disposal in a clear, simple and straight forward manner. The book is well worth 15s.

Medicine, Science and the Law. First number of a new quarterly journal. Published: 21.11.60.

3s. p.a., post free; 17s. per part, postage 10d.
This official journal of the British Academy of Forensic Sciences is the first number of a new quarterly which is likely to prove a useful addition to any central medical or hospital library. Edited by Dr. Francis E. Camps, it is well produced, very readable and most informative. It is of interest to a wide range of professional men, particularly medical examiners, pathologists and psychiatrists. Nearly half the contents of this issue is devoted to abstracts relating to law and the scientist and to numerous aspects of forensic medicine. The article by Glanville Williams, Barrister-at-Law, on the medico-legal implications of a plea of diminished responsibility merits careful attention and study by any doctor concerned with the examination of criminal offenders.

The Treatment of Tropical Diseases. W. H. JOPLING, M.R.C.P., D.T.M. & H. Bristol: John

Wright and Sons Ltd. 1960. Pp. 188+vii. 20s.

This little book succeeds in giving a remarkably up-to-date summary of the treatment of Tropical Diseases. There is little to criticize adversely. There is surprisingly no mention of the value of folic acid in the treatment of tropical sprue. No doubt this omission will be remedied in subsequent editions. There is no reference to toxoplasmosis. This is a pity because it is a disease whose importance is expanding. The author's special experience in the treatment of leprosy has enabled him to give an admirably clear, concise and authoritative account of the treatment. The section on the treatment of the systemic mycoses, which is so poorly tackled in other text books, is well done. Dr. Jopling has provided full references at the end of each chapter. The appendices form a very useful and engaging feature of the book. The appendix on active immunization against typhoid fever, cholera, plague, typhus and yellow fever is especially helpful. The book is a handy size and can be slipped into the pocket. It is just what is required for harrassed students having a final brush up on treatment before the D.T.M. & H. examination. R. J. G. M.

The Urological Aspects of Bilharziasis in Rhodesia. R. M. HONEY, M.B., F.R.C.S. (Edin.) and M. GELFAND, O.B.E., M.D., F.R.C.P. Edinburgh and London: E. & S. Livingstone Ltd. 1960. Pp. 67. 7s. 6d.

This book emphasizes the secondary changes in chronic schistosomiasis of the urinary tract. Besides chronic cystitis, urethral stricture and involvement of the seminal vesicles and prostate, the ureter and kidneys may be affected; secondary contraction of the bladder, ureteric stricture and dilation may all lead to severe hydronephrosis, and this in turn to uræmia, pyelonephritis, hypertension and death. The investigation and treatment of these complications is fully described together with the natural history, symptomatology and signs of urinary bilharziasis. The point is made that so many drugs will rid the urine temporarily of ova without curing the disease. Cystoscopy in this disease is particularly well described. The varying manifestations of the disease in different parts of the African Continent account no doubt for some of the disagreements with other authorities, such

as in the rarity with which they found secondary acute cystitis. The book is written in a clear and pleasing style, excellently illustrated, and is a valuable addition to any tropical medicine library.

WO'R

British National Formulary. Published jointly by the Pharmaceutical Press and the British Medical Association. Pp. 272. 7s. 6d.

This revised edition has been brought up to date without any change in the familiar layout of the booklet. Apart from some new additions and omissions the mixture is very much as before. The juxta-position of the new antibiotics and steroids with Mist Gent Alk and Mist Strych et Ferr faithfully represents the state of modern medical practice. It remains a most useful reference book.

W O'R

Demonstration of Physical Signs in Clinical Surgery. 13th Edition. HAMILTON BAILEY, F.R.C.S., F.A.C.S., F.R.S.E. Bristol: John Wright & Sons Ltd. 1960. Pp. 928+xvi. 75s.

The new edition of this well-known and highly successful book has doubled its size since it last appeared in 1954. The increase is due to a fuller text and to an additional 400 figures. That its success is assured I have no doubt, and also that it will fulfil the author's claim that it will be of use as a refresher to the qualified doctor and to candidates working for the final fellowship; but it is still to the clinical student that this book performs the greatest service. The text has been revised throughout, being expanded in most instances, and supplemented by the welcome addition of new chapters on the pharynx, nose and osophagus. Fortunately in expanding the book there has been no loss of that direct style of presentation by which Mr. Hamilton Bailey is renowned and which most students find so helpful. In such a well illustrated book I feel it is a pity that a number of illustrations leave a lot to the reader's imagination and some, usually the colour ones, are very poor, e.g., Figs. 38, 55, 62, 66, 76, 376, 402, etc. In a book which depends so much on good illustrations for its teaching value it is desirable that such a weakness should be overcome. Apart from this criticism I cannot praise this book too highly; it is a mine of information.

Handbook of Bacteriology. 10th Edition. A guide to the Laboratory Diagnosis and Control of Infection. MACKIE and McCARTNEY. Edinburgh and London: E. & S. Livingstone, Ltd. 1960. Pp. 949+xi. 40s.

Professor Cruickshank and his collaborators are to be congratulated on producing such a worth successor to the previous editions. The book is considerably enlarged and more space is given to the consideration of viruses and practical methods used in diagnostic virology. The technical methods are succinctly and clearly described. This new edition will, like its predecessors, be almost essential as a bench book in laboratories, as well as being valuable to students. The volume is stoutly bound, a wise precaution since it will, undoubtedly, be referred to frequently.

D. W.B.



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MAY 10 MITH'S ISSUE

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Vol. 107 No. 2 APRIL 1961

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THE Journal was founded in 1903 to publish among other things: "(1) Original articles written by officers of the Royal Army Medical Corps and others. (2) Bibliographical notes on articles of importance and interest to the military services. (3) Re-prints and translations from military, medical and other journals. (4) Official gazettes and official information generally bearing upon the Army Medical services." This outline has changed little. The Editor is still glad to receive articles, reports, notes, letters, or reviews, from any author, in or outside the R.A.M.C., on professional or personal matters, and he particularly welcomes anything of a non-specialist nature.

All papers intended for publication must be submitted in original type-written copy, double or triple spaced, on one side of good foolscap with generous margins, fully corrected. Any paper not up to these standards may be returned. Authors whose material is based on Service experience are reminded of *Queen's Regulations* (1955), amended July, 1957, para. 680. and are asked to send a copy to the Editor at the same time as writing to PR 1 (a).

There is no set style, but all abbreviations must be avoided. Contributors are on the increase and, with constantly rising costs of production, their papers must be brief. Papers are accepted on the understanding that they are subject to editorial revision, including alterations to condense or clarify the text, and omission of tables or illustrations. Titles must be brief and, if possible, attractive. Lists of References must be on a separate sheet, in alphabetical order, and limited to those mentioned in the text, where they should be in the form "Makewater (1962) observes . . ." or "(Makewater, 1962)." The Harvard system for bibliography is recommended and abbreviations must be according to World Medical Periodicals, 2nd Edition (1957).

The main author of each paper will receive a proof, which should be corrected and returned to the Editor swiftly. The submitted typescript is assumed to be ready for printing without further alteration. Allowance is made for reasonable corrections; unreasonable corrections may be disallowed, or charged to the author. An author who subscribes to the *Journal* is entitled to up to 50 reprints free, divided between the authors of a joint paper.

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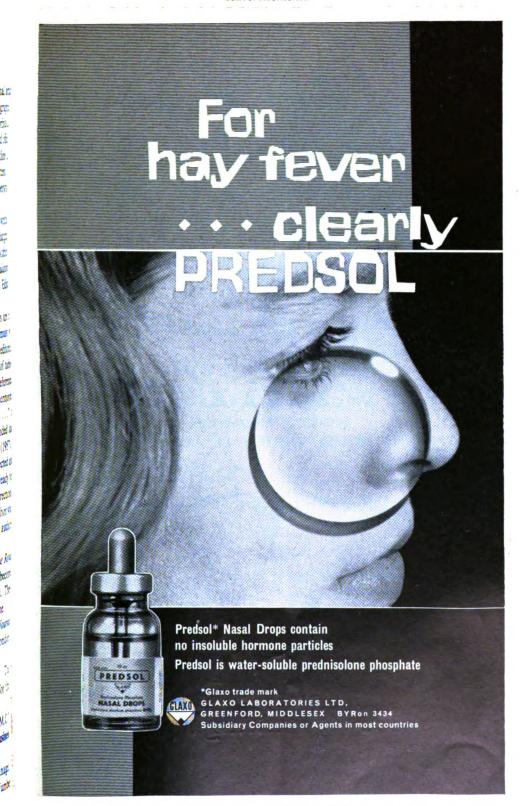
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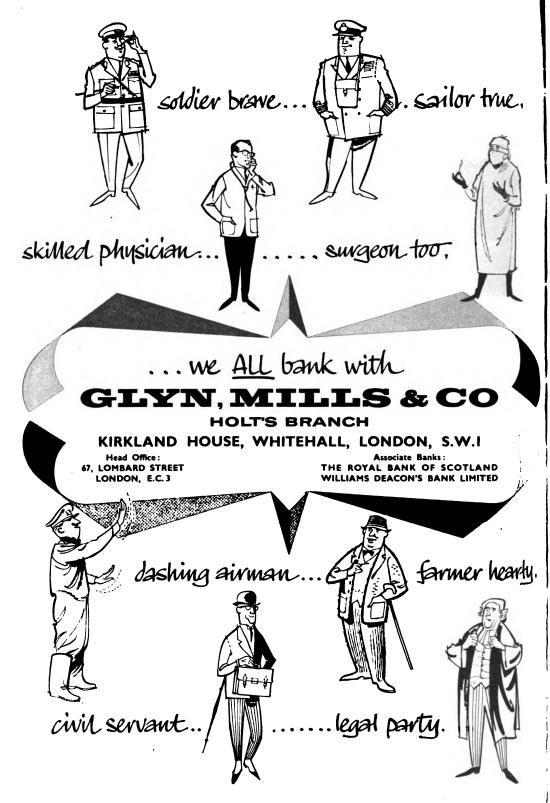
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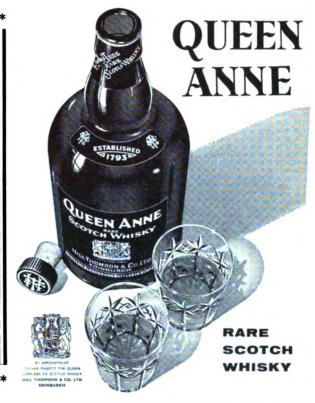
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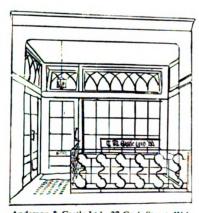
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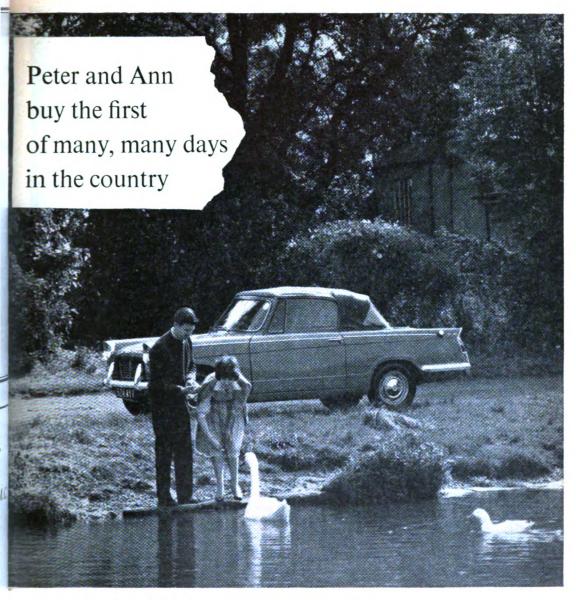
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WE are glad to have a letter in this issue from General Richardson which raises a subject most important to us; the policy of the Journal. It has always had its critics, some of whom have appeared in our correspondence pages, and we hope that many more will do so soon. We do not agree with General Richardson that the Journal should be "purely professional", but until we can learn more of what is generally felt about this, we must retain an open mind. Some common misconceptions about the Journal must be cleared away. The Journal is not official, and we do not feel that anyone should be obliged to buy it. It is no use looking to the Journal as an oracle for the Army Medical Directorate. An author may say what he likes providing it is not misleading, and we will defend him in the usual way, with anonymity if he wishes. Our pages are open to anyone, medical or not, although naturally a contribution from within the Corps will be as favourably considered as any. We hope to make the Journal interesting to any reader and so to serve both our contributors and the Corps. We would like to have more reports of interesting cases and, without any claim to editorial omniscience, we would welcome questions on any problem which we in the metropolis may be in a privileged position to answer. We see no reason why the Journal should so often be mentioned in the same breath as the Corps charities, worthy though these are. The Journal has a weight of tradition, but we think it can be vigorously self-supporting; it is not in immediate financial stringency, and what now seems most needed is intellectual help from the Corps which it to some extent represents to the world.

Professor Stuart-Harris has long been noted as a virologist and when he came to the College lately he showed himself an accomplished lecturer; we are very glad to publish his fascinating lecture. Sir Russell Brock has very kindly given us the view from the Royal College of Surgeons of the new Chair now jointly held between them and the

62 **Editorial**

Royal Army Medical College in Military Surgery, the achievement of which is obviously going to be of increasing importance. Sir Russell, as chairman of the Research Committee, did a great deal to establish it. Sir Russell mentions the surgical implications of new weapons, and Colonel Brown gives us hope in tackling their possible medical consequences. Major Crowdy too has been concerned with the effects of nuclear warfare on health in the field and offers a controversial point of view. Colonel Jeffrey suggests weaknesses in the official approach to the everyday problems of radiation, and from careful analysis of a monumental amount of laboratory work draws fresh conclusions on that intriguing subject which the clinician so easily loses sight of, the normal. Colonel O'Brien too throws light upon a very common disease of great importance for the Army. Colonel Steele tells of an interesting departure in Territorial training, a field of which we hear too little in the Journal. Two more of the articles specially written for the Centenary of the College are included. We now publish the splendid bibliography of Sir William Leishman, which, as we have already explained, looks forward to a further centenary noteworthy for the R.A.M.C. We are grateful to Captain Scott and Warrant Officer Miles for adding some interesting correspondence; the problem so clearly presented by W.O. Miles must surely be solved if there is to be any easing of the acute position in recruiting to the ranks. Last, but not least effective, we are glad to have the enjoyably informative account by Private Catterick of the object which must strike awe into any one coming to Millbank nowadays.

A LOST GENERATION?

THE question of pay for National Service medical officers has again been raised, this time by the British Medical Association. The increase of basic pay over the last twelve years for house officers in the National Health Service has been about 90 per cent, for serving medical officers with Regular Commissions about 50 per cent and for National Service medical officers scarcely 10 per cent.¹ The Council of the B.M.A. evidently felt that it had so strong a case here that it "protested to the Ministry of Defence about the pay of National Service medical officers and requested an immediate increase, with retrospective adjustments."2 These words must have roused doctors who did National Service in the years for which their civilian colleagues receive extra back-pay. The Royal Commission did not have to consider their position, and they were cut off from the jubilation of the civilian profession. Their grievance has been forcefully expressed: "the loss of two years' retrospective payment to this minority of young doctors would be financially crippling, for they have now to start afresh in the medical world, without the help of a gratuity and often with family commitments "3; or "it seems a cruel irony that one should be penalized so severely for serving one's country "4; "I cannot but envy my female and flat-footed contemporaries who have benefited financially and professionally while I was doing my

Brit. med. J. (1961).
 Brit. med. J. (1961).
 Supplement, 1, January 7.
 Brit. med. J. (1960).
 Supplement, 30, January 28.
 Brit. med. J. (1960).
 Supplement, 177, March 26.
 Brit. med. J. (1961).
 Supplement, 17, January 21.

National Service "5; or a more bitter description of the hardships of "doctor-conscripts," "the exploitation of such doctors in peacetime as a form of expendable cheap labour." The B.M.A. appears to have both facts and feeling on its side.

The Ministry's reply seems well-designed to aggravate every resentment. "I would point out that it is not the intention of the Government that rates of pay of National Servicemen should be in any way comparable with what might be earned in a civilian occupation or profession, or indeed as a professional soldier. Given in addition to free food, accommodation, clothing and amenities, pay for the National Serviceman is regarded as the minimum necessary during a limited period of compulsory Government service." The letter² then describes promotion after one year's service, marriage and ration allowances, and National Service grants for "cases of special hardship." The matter is therefore referred to the Armed Forces Committee of the B.M.A.

The B.M.A. have a strong case by any standards, but there are special factors in the present situation making it more urgent that justice should be done. While the new regular medical officers are trained to take over the care of our all-regular Army, the brunt of general duties at home and overseas will fall on the dwindling band of National Service doctors; as numbers run down they will have to work harder and harder. Although this is what many want and enjoy, they are not very likely to feel, when they leave the Army and try to re-enter the rat-race of the National Health Service, that they are any better qualified than their colleagues who missed National Service. Many doctors recently called up have enjoyed longer deferment than usual, are more experienced and skilled, and some of them have already achieved registrar status. If they are also to suffer a heavy financial handicap, the Corps is liable to be severely harmed. For to whom will a medical student or young doctor turn to find out about the prospects in the Forces, unless to someone who has been in the Service? If such a career appears ill-rewarded, it may take at least a generation to reverse the bad reputation which is so disastrously building up now. Increases in pay for army doctors have never kept pace with those in the profession as a whole. It will be far more costly to repair the damage too late, than try to compensate now these young doctors, many of them trained at public expense, for the growing disheartenment they must otherwise suffer while National Service comes to a stop. We must hope that the British Medical Association will receive the strongest possible support from the Services in its efforts to prevent now this terrible drain on present morale and future recruiting.

It might be held that for recruiting purposes a large differential must be maintained between the pay for National Service and regular medical officers. But the terms for a Short Service Commission also remain as they were before the Royal Commission's increase for the civilian profession, and especially its junior members. Every day that better pay for Short Service medical officers is delayed more doctors leave the R.A.M.C. for the more attractive financial conditions of the National Health Service. Someone must act before it is too late.



Brit. med. J. (1961). 1 Supplement, 66, February 25.
 Brit. med. J. (1961). 1 Supplement, 39, February 4.

PURE WATER FROM FOUL

Major J. P. CROWDY

M.B., D.P.H., D.T.M. & H., D.I.H., R.A.M.C.

Past, and indeed present, policies for the selection of water sources in the field lay great stress on the avoidance of animal and human pollution. The handbook for medical officers (War Office, 1953) suggests that river banks should be patrolled for two or three miles above the water point intake. The excremental contamination of any water which is ultimately intended for human consumption must at all costs be prevented; this is always the official teaching. There is no doubt that the elimination of all pollution is a sound method of reducing the risk of water-borne disease, but this counsel of perfection is unlikely to be practicable in nuclear warfare. The tactical doctrines imposed by the use of nuclear weapons will probably mean that troops will operate in small independent formations, widely dispersed, isolated in time and place. and moving only by night. There will be no time for the leisurely location of good clean water points with a two-mile patrol up the river banks. Water supplies will be at such a premium that a unit will be glad to accept almost any source that offers. whatever its quality. It may well be that the most obviously suspect sources, be they river, stream, pond, ditch, or even sewer, will have to be pressed into use to sustain life. These rather gloomy thoughts on the possible pattern of field water supply during a major conflagration have provoked a new approach to purification methods.

The Blackwater Trials

Part of the recent trials at the Army School of Health of the 3,000 gallons per hour (g.p.h.) mobile water purification set was designed to test the ability of this type of equipment to produce by filtration and chlorination a potable water from a source highly polluted by sewage. Recent fæcal contamination of water, the essential link in the transmission of water-borne disease, is characterized by two features: an abundance of Bacterium coli, and a high concentration of ammonia, present as a mixture of the ammoniacal and albuminoid forms. For the trials a source of water with these characteristics was eventually found on the River Blackwater where it flows from Camberley towards Sandhurst Village. It is interesting that the lake at Mytchett, the home of the Army School of Health. was found far too clean. The Blackwater River, on the other hand, was little different from an average sewage effluent. Its turbid flow harboured a myriad of bacteria. Presumptive coliform counts extended beyond 54,000 organisms per 100 ml., and plate counts at times exceeded 150,000 organisms per ml. Its chemical constitution was in keeping, with an ammonia content of 1.28 mg./litre. This insalubrious watercourse was certainly living up to its name, and it promised to serve well as a source highly contaminated by fæcal pollution. In fact the Blackwater represents a higher degree of pollution than that found in most rivers of the British Isles with the notable exception of the Thames (Taylor, 1958), but there must be few rivers in our highly civilized country which do not receive at some stage of their progress to the sea a liberal donation of sewage effluent.

The present army 3,000 g.p.h. water purification plant is the Mark V manufactured by the Paterson Engineering Company of London. For disinfection it employs the principle of electrolytic chlorine, produced by taking a by-pass from the machine's main flow of water, saturating it with sodium chloride, and then, in a specially designed "Clorocel", passing through this brine solution a direct electric current. The effective product of the electrolysis is a solution of highly active sodium hypochlorite which in its turn is fed back as the disinfecting agent into the main flow of water. In addition to chlorination the water is filtered through a large stellar filter. There are alternative chlorine injection sites, one before the filter and one after. As designed, the set chlorinates before it filters, but it was thought that when heavily polluted waters were to be treated, the injection of chlorine into an

unfiltered flow would result in considerable chlorine wastage due to its absorption by the suspended organic matter. For this reason it was resolved to find out whether there would be less (and if so, how much less) deviation and waste when the chlorine was injected into already filtered water. Two other points in connection with the plant need explanation. First, the chlorine dose applied is governed by the current through the Clorocel, flow through the plant being around a constant 3,000 g.p.h.; for example, if 10 amps imparts to the effluent water a concentration of 1 p.p.m., a current of 20 amps will produce 2 p.p.m. Alternatively, the chlorine concentration may be varied, the current remaining constant, by adjusting the flow; if 10 amps. at 3,000 g.p.h. produces 1 p.p.m., reduction of the flow rate to 1,000 g.p.h. will raise the concentration to 3 p.p.m. Secondly the "Filtraider" is an apparatus for feeding into the filter an extra supply of filter powder to intermingle with the suspended matter and so prevent the deposition around the elements of an impervious layer of retained dirt. With turbid waters the Filtraider helps to extend the useful life of the filter bed.

That part of the trials described here represents the culmination of considerable experience with the Paterson set. In July, 1959, a full but simple test was organized at the Blackwater site. Samples of treated water were taken from the machine for the estimation of their chlorine and bacterial content, while regular decreases were made in the amount of chlorine injected by reducing the Clorocel current in 5-amp, steps from its maximum to nothing. This was first done with chlorine injection before filtration and then repeated with it after. Although this plan was straightforward the collection of samples became an extremely complicated drill. Each one had to be tested not only as it emerged from the machine but also at 15 (T+15) and 60 (T+60) minutes after this. For the series with chlorination before filtration, samples were taken from a draw-off tap in the main outflow pipe about eight feet from the machine. In the other series the turbulence of the filter no longer helped and this mixing pipe was too short for even distribution of chlorine. A quick-emptying bulking tank was used to overcome this. Samples in the second series were from a draw-off point in the tank and so were slightly delayed in time compared with the first series.

Samples were taken at each downward step in the Clorocel current, but only after the machine had been stabilized for a few minutes at its new setting. At the actual time of sampling one chemical and two bacteriological specimens were collected. The two bacteriological samples taken in standard 6-oz. sterile bottles were stabilized 15 and 60 minutes after collection by the addition of 0.1 ml. of a 3 per cent solution of sodium thiosulphate, which was sufficient to neutralize the chlorine present and so give a true picture of the bacterial population at T+15 and T+60. Earlier work had shed doubt on the value of the instantaneous (T) bacteriological sample, and as in practice a 15-minute contact period will always be available, it was omitted in this trial.

The bacteriological examination was confined to a presumptive coliform count and an agar plate count after 24 hours at 37°C. The standard multiple tube method recommended by the Ministry of Health (1957) was employed for the coliform examination, using one 50-ml. and five 10-ml. tubes all with double strength MacConkey neutral red. It was intended to subculture all positive tubes, but the water bath was too small. Therefore a representative selection were subcultured at 44°C. to confirm the organisms as *Bact. coli* I. Positive results were interpreted by the W.H.O. International Standards (1958). Raw samples were examined by the same technique, although considerable dilution was needed to get results on the same scale; plate counts were done at varying dilutions up to 1 in 10,000, while the whole range of tubes was used for the coliform estimation (one 50 ml., five 10 ml., five 5 ml. and five 0.1 ml.).

The chemical samples were collected in open 150-ml. beakers and estimations were made from them at T, T+15 and T+60. All the chlorine residuals were estimated with an E.E.L. colorimeter using diethyl-phenylene diamine (D.P.D.), an indicator which enables both free chlorine and chloramine residuals to be measured in the same sample. D.P.D. first shows the free chlorine content, but the addition of potassium iodide allows the total of all chlorine fractions to be measured. The chloramine concentration is then found by subtracting the free figure from the total. After early difficulties with this method, which was based on that of Palin (1957), success was achieved when the D.P.D. was prepared as an oxalate and used with an improved buffer solution. Differentiation of the chlorine fractions in the Blackwater proved unimportant, as all the chlorine produced was present as chloramine.

A difficulty encountered throughout was that of maintaining a constant flow of water through the machine: a fluctuating rate of flow would have the effect of introducing a further variable into an already complicated situation. The Filtraider was used to keep output even, which meant that each series, taking about two hours, could be completed without dropping the filter bed. At the start the pump output was reduced so that it could be increased as the filter back-pressure rose towards the end of each series. In this way a reasonably even rate of flow was achieved for both series, although it was well below the maximum of which the machine was capable. The fluctuations in flow were only minor and the real interest lies in the correlation of the chlorine residual with its bactericidal effect.

Results

The bacterial findings in the untreated water have been mentioned above; its pH was 7.4 with 0.12 mg./litre of nitrogen as nitrite and, with 1.28 mg./litre of ammoniacal ammonia, there was 0.43 mg./litre of albuminoid ammonia. Its temperature of 19°C.; probably near the upper limit of river temperatures in Britain, should be noted because the action of chlorine is depressed with falling temperature. The effects of treatment on this raw water are set out in Table II with the Clorocel current ranged against the bacteriological and chemical results.

TABLE I
Chemical and Bacteriological Findings in Treated Water

		Time (T) Time (T + 15)					Time (T + 60)				
Series	Current in amps.	Flow in g.p.h.	Chloramine Residual in p.p.m.	Chloramine Residual in p.p.m.	Presumptive Coliform Count in Organisms/100 ml.	B. coli I Confirmation	Plate Count in Colonies/ml.	Chloramine Residual in p.p.m.	Presumptive Coliform Count in Organisms/100 ml.	B. coll 1 Confirmation	Plate Count in Colonies/ml.
1	75 70 65 60 55 50 45 40 35 30 25 20	2,200 2,350 2,400 2,250 2,300 2,300 2,300 2,300 2,350 2,200 2,150 2,100 2,000	6.4 5.7 5.2 4.9 4.5 4.0 3.7 2.9 2.7 2.3 2.0 1.4	6.0 5.5 5.0 4.5 4.1 3.6 3.4 2.7 2.4 2.1 1.7	0 0 0 0 0 0 0 0 1 2 > 16 > 16 > 16	ve ve + ve + ve + ve	7 10 10 18 3 10 8 14 18 40 25 24	5.5 5.0 4.6 4.0 3.8 3.5 3.1 2.4 2.2 1.8 1.5 1.1	0 0 0 0 0 0 0 0 0 0 0 0 2 1	ve ve	2 4 7 14 4 12 14 23 4 28 11 13
2	68 65 60 55 50 45 40 35 30 25 20 15	2,300 2,250 2,150 — 2,150 2,200 2,100 — 2,050 2,000 1,950	5.4 5.2 4.6 4.6 4.2 4.0 3.4 2.9 2.4 2.0 1.5 1.0	5.2 5.1 4.8 4.4 3.9 3.6 3.1 2.6 2.2 1.9 1.5 1.0	0 0 0 0 0 0 0 0 2 2 2 2 16 > 16 > 16 > 16 > 16 > 16 > 16 > 16 >	— ve + ve - ve - ve + ve + ve	4 9 2 9 10 3 8 19 6 11 25 240	5.2 4.8 4.7 4.2 3.7 3.5 3.1 2.4 2.0 1.6 1.4 0.8 0.4	0 0 0 0 0 0 0 0 0	ve ve ve	5 2 3 13 6 3 6 7 6 11 4 12

In so far as the current applied is proportional to the injected dose of chlorine, the flow rate may be assumed constant. As would be expected with the high ammonia concentration and an upper practical limit of chlorine application in the region of 6 p.p.m., free chlorine was not formed and the

residual was exclusively chloramines, namely monochloramine, dichloramine and possibly nitrogen trichloride. It is well known that the relative abundance and bactericidal effect of these different chloramines varies with pH and temperature, but in practice it is unlikely that these variations would invalidate considering these substances collectively. The chloramine residual persists remarkably: its fall-off during one hour is extremely small at all values in both series. The bacteriological results both at T+15 and T+60 show a marked similarity between the two series. The slow change in the bacterial picture during the contact period suggests that the main effect was achieved in the first 15 minutes. The plate count shows the trends in the disinfection process. Table I shows decisive results in freedom from pathogens, which is the principal application of the coliform count. In both series residuals at time T as low as 3.7 p.p.m. of chloramine have produced a sample at T+15 in which coliforms were absent from 100 ml.

Discussion

Before discussing whether the Paterson Mark V set was capable of producing pure water from foul, some criterion of the purity demanded must be established. Army water purification practice suffers from the time-honoured misuse of the word "sterilization." The term is only mentioned here to dismiss it: sterility is not necessary in drinking water, but absence of pathogens is. Perhaps the best term would be disinfection. Even so there exists no absolute standard of disinfection, and all codes of practice are empirical, relying on the coliform examination for a criterion. Certainly the absence of coliforms from at least a 100 ml. sample is most important and indeed essential. These hardy organisms are capable of outliving the majority of water-borne pathogenic bacteria and most of, but by no means all, the more important infective viruses. As regards the total bacterial flora of treated water there is less unanimity. Probably the most reasonable figure for an allowable maximum in the standard plate count is that suggested by Taylor (1958) of 10 colonies/ml. But whatever figure is accepted, it is important to realize that the absence of coliforms is of much greater significance than any plate count.

It is unlikely that a worse set of circumstances than those in the River Blackwater will ever be encountered in military water purification, with the possible exception of similar waters at a much lower temperature. Nonetheless the conditions were sufficiently adverse to provide a realistic test of the machine. Table I shows that in 15 minutes a potable water has been produced in all samples which had an initial chloramine concentration of 3.7 p.p.m. or more; in fact a value as low as 2.9 p.p.m. has produced almost acceptable results. It can safely be deduced that a chloramine concentration of 4 p.p.m. in the emergent stream will produce a safe water 15 minutes later. Extension of the contact period to one hour allows no lowering of this figure, because there is little bactericidal effect in the extra 45 minutes. This conclusion is at variance with the standard military teaching on chloramination, which has always stressed the need for a prolonged contact period of at least one hour (War Office, 1954). The finding of a much quicker bactericidal action reinforces the work of Butterfield (1946), who showed that a bacterial kill was achieved more quickly where ammonia and chlorine were added separately rather than as chloramine. It seems likely that the quick action of chloramine here may be due to the direct action of the highly reactive electrolytic sodium hypochlorite before it has had time to form chloramines by combination with the ammonia in the raw water. It may also be that these previously rather undesirable chloramines are a benefit in disguise. Formed after the main bactericidal effect has already taken place, they will remove, at least in part, subsequent taste problems and confer on the water a long-lasting bactericidal potential.

Of the subsidiary aims of the trial little need be said. There would appear to be very little difference in the results achieved by chlorination after filtration when compared with the standard arrangement of injecting the chlorine before the filter, although this has the advantage that adequate mixing is ensured while the water passes through the filter. The chloramine residuals produced for equal current values in the two series are almost identical, disposing of the supposition that the greater deviation likely in prefiltration chlorination would result in a lowered residual.

It is already accepted army practice (War Office, 1957) that where free chlorine is employed a residual of 2 p.p.m. free chlorine present 15 minutes after application will ensure a safe water. There is little doubt that this method allows a wide margin of safety. But using the Paterson machine without proper contact tanks it is not a practicable proposition to measure the residual 15 minutes after

chlorine injection. Indeed, working at this high rate of flow, the possible re-treatment of an inadequately chlorinated tankful is a forbidding prospect. Measurements must be done on the emergent water if confusion is to be avoided. Four p.p.m. of chloramine in the outflow has in these trials produced a potable water. Similarly, and not unexpectedly, it has been shown that 4 p.p.m. of free chlorine from the Paterson set will do the same (Army School of Health, 1959). But what of a mixed residual in the treated waters? A mixture of chloramine and free chlorine is unstable and a process of mutual destruction goes on. This is the process that causes the so-called break point phenomenon where chlorine and chloramine interact to reduce the total residual as more chlorine is applied. Thus the decay pattern of a mixture of chlorine and chloramine is not as predictable as that of either constituent alone. But if it is accepted that most of the bactericidal effect is achieved in the early minutes by the action of electrolytic sodium hypochlorite, then whatever the ultimate fate of the chlorine, be it complete conversion to chloramine or self-destruction by a mixture of free chlorine and chloramine, the bactericidal effect will be unaltered. In other words, in the Paterson set 4 p.p.m. of chlorine in the output regardless of its chemical composition will produce a safe water after 15 minutes.

Summarv

Trials were carried out in the summer of 1959 to assess the effectiveness of the service pattern 3,000 g.p.h. water purification set in dealing with water heavily contaminated by sewage. Part of these trials are described in detail. The results collected revealed that in a water of high ammonia content the chlorine produced by the machine was present exclusively as chloramine. These chloramine residuals disinfected the water more quickly than past experience would suggest. It is possible that chlorine produced electrolytically, as in the 3,000 g.p.h. set, has a greater activity than a preformed product. It is therefore suggested that a 4 p.p.m. chlorine residual of whatever composition will produce a safe water in 15 minutes' contact even under conditions where the raw water is little better than a sewage effluent.

I am grateful to the Commandant and the Senior Instructor of the Army School of Health for unfailing patience and inspiration throughout the conduct of these trials. To the Paterson Engineering Company I extend my thanks for their very considerable material assistance.

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THE CHAIR OF MILITARY SURGERY

Sir RUSSELL BROCK

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Surgeon to Guy's Hospital

As described by Colonel Watts in the Centenary number of the Journal, the Regius chair of military surgery was established at Edinburgh University in 1806, under George III. There were two professors and then the chair was abolished in 1855. It was revived when the Army Medical School was founded at Fort Pitt, Chatham, in 1860. In the succeeding decade Lister began those observations and experiments that were to lead to the great expansion of surgery which inevitably affected the military surgeon as much as his civilian colleague. The potentialities of the surgeon's contribution in war now became immense. Unhappily so many of the lessons learned in one war are forgotten by the next, and this has applied to surgery as to most other things. Also, no one war is like its predecessor and this is especially true of surgery in warfare in view of the profound technical advances that occur in the development of destructive weapons. Surgery must not only remember the lessons of the past, but should also strive to keep abreast of the new problems as they arise and also, by experiment and research, try to anticipate the problems of treatment of the injuries resulting from the newer and more destructive weapons which are being fashioned so actively.

The recognition of the need for this research in war surgery and for the appropriate training of surgeons who will be involved in it has resulted in an important development in the duties of the Professor of Military Surgery. Rather than being occupied chiefly in administration or in clinical work, he is to be primarily connected with teaching and research. The conception of the Professor's activities being developed in this way is important and far-seeing and is much to the credit of those in the Royal Army Medical Corps who initiated and guided the change. Moreover, the wisdom displayed did not stop at the initiation of the idea but also considered ways in which it could be carried out. Seeing that the new prime duties of teaching and research are dominantly academic an approach was made to the Royal College of Surgeons of England by the Director-General, Lieutenant-General Sir Alexander Drummond, with the approval of the War Office, to ask if the College would help in the furtherance of this important work.

It is interesting to recall that during the century since the founding of the Royal Army Medical College, the Royal College of Surgeons has itself progressed from what was essentially an examining body to a large academic organization by the addition of postgraduate teaching and a big research programme to its earlier restricted, vocational function. Florence Nightingale had little use for the Royal Colleges, and said so; today she would surely have welcomed and supported the approach made to the College for academic help and partnership.

The suggestion was warmly received by Council, who at once set up a representative committee to consider how it could best help. The Committee met together with

representatives of the Army Medical Services including the Director-General. A cordial and fruitful discussion was followed by complete agreement on the recommendations to be made. An important and statesmanlike comment came from the Director-General; that in the event of no suitable Army officer being available to fill a vacancy as Professor, it would be permissible to appoint an officer of the Royal Navy or Royal Air Force.

In discussing the place of research it was emphasized that the idea underlying the proposal of the link with the College was the need for the continuous application of surgical trends to modern warfare. Association with the College would give the Professor a consultative service whereby he would have direct access to the Heads of the Scientific Departments and the opportunity of discussing problems with them. It was appreciated that the Department of the Military Professor was already engaged in much important and varied research into the application of modern surgical methods for war surgery. If the Professor required space for research at the College or at the Buckstone Browne Farm this could be arranged. In return it would be open to the College Professors to consult the Professor of Military Surgery about any problems having a military aspect and, if necessary, to use such army facilities as might be available at the Royal Army Medical College or the Queen Alexandra Military Hospital, and in all other ways to further the pursuance of any joint project. In regard to teaching it was agreed that the Royal Army Medical College would be prepared to open its lectures on Military Surgery to postgraduate students of the College.

The Committee had no hesitation in recommending to Council:

That the Professorship of Military Surgery, Royal Army Medical College, be made a joint Professorship with the Royal College of Surgeons of England.

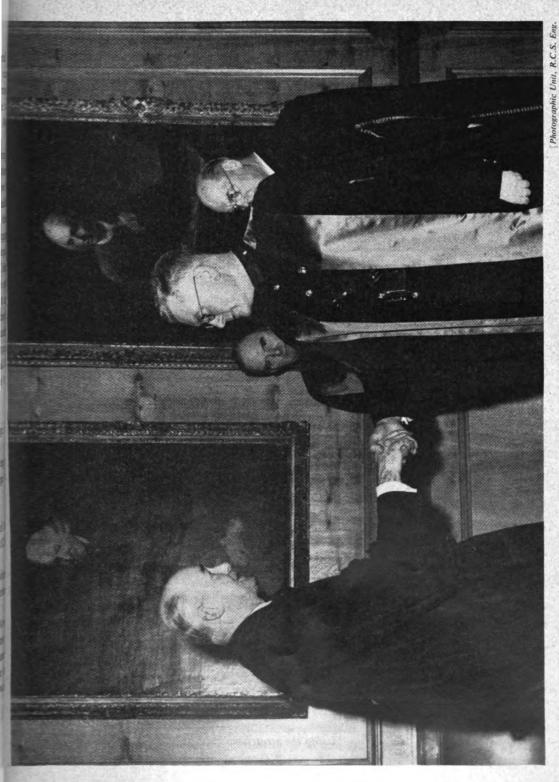
That for future vacancies a joint selection committee be set up consisting of representatives of the Army Medical Services and of the Royal College of Surgeons.

That the academic arrangements earlier described should be approved.

Council warmly approved these recommendations and also the selection of the present Professor of Military Surgery, Colonel J. C. Watts, O.B.E., M.C., F.R.C.S., as the first Joint Professor.

Colonel Watts was formally introduced to Council at the January meeting where, supported by Sir James Paterson Ross and by General Drummond, he was welcomed by the President, Sir Arthur Porritt.

Thus has been initiated an academic companionship between the Royal Army Medical College and the Royal College of Surgeons, founded on matters of common interest and which we can feel with confidence will evolve to the great and permanent advantage of both. This close academic association will extend and emphasize the happy relationship that has always existed between the two Colleges. We look forward to many practical benefits emerging.



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Preparing the stretcher



Using the stretcher

MOUNTAIN RESCUE IN THE R.A.M.C.

Lieutenant-Colonel G. A. STEELE

M.B., R.A.M.C. (T.A.)

EARLY in 1960 it was decided that 126 (Lancashire) Field Ambulance R.A.M.C. (T.A.) should form a Mountain Rescue Section. There were four main reasons for this. First as an aid to recruiting. The role of the R.A.M.C. has little glamour to attract recruits interested in vigorous, adventurous service, but the national newspapers frequently contain accounts of mountain rescue teams working over the week-end to rescue injured climbers. It seemed logical that the R.A.M.C. with its traditional role of evacuation of casualties should be capable of this rescue work. Secondly mountain rescue training would provide a realistic context for many useful military skills—map reading, route finding and first aid. Thirdly it would provide an opportunity to have one section of the Field Ambulance trained as a team for mobilization or ready for any emergency. Fourthly it would give the unit a mark of individuality. This is very important when three R.A.M.C. (T.A.) units share one drill hall.

The conditions for service in the section were published in Part I orders. It was advertized in the press and there were a number of volunteers. It was intended that training would begin after Annual Camp and that the section would be formed in the autumn. In May, 1960, however, it was announced that 53 (Welsh) Infantry Division (T.A.) was to hold a four-day 80-mile mountain march in North Wales. This Cambrian March was to be held in August as a competition open to all major units of the division. We wrote to the organizers describing our Mountain Rescue Section and volunteering to take part in the event. In July our offer was accepted, and we were invited to form the follow-up party to deal with any casualties en route. We therefore trained to improve the physical fitness of the team and to experiment with equipment.

On the 23rd August, the detachment proceeded to Towyn for the march, with two medical officers, one sergeant, and six rank and file, one two-stretcher ambulance car and one troop-carrying vehicle. The medical element came to include a solitary gunner, something that could happen only in the Territorial Army. He should have marched with the non-medical element, but he had been a miner and the dust had affected his wind. On the first gradient, he dropped back to join us. He made a rapid appreciation of the situation and discovered that the R.A.M.C. slept dry, fed well and had plenty of laughs. He stayed with us until the final march-past. The follow-up party was joined by a non-medical element of one officer, one sergeant and ten rank and file. These were all volunteers who could not march with a team because either their unit had withdrawn from the competition, or it was at full strength and they were reserve members.

The order of march for the first day was determined by ballot and the 23 teams left at two-minute intervals. The non-medical section followed the last team and the Mountain Rescue Section brought up the rear. The first casualty fell out after one

mile with tightness of the chest and was evacuated back to Towyn in a press photographer's car. It is not known whether he provided the material for the very harrowing press reports which appeared the following day. During the six miles to the first control point, several more minor casualties were picked up and relieved of their packs. Walking at a slow pace, all reached the control point where transport was available. The next section of the march was the most difficult. Weather conditions were atrocious with rain and mist, and the Rescue Section met its first problem. The teams proceeded independently, and from time to time a team with a leader whose confidence in his map reading was entirely misplaced would be seen to deviate from the route at an acute angle. The rear party had orders to stick to the route, but by dividing into two parties and sweeping side by side, we picked up a casualty who might otherwise have been overlooked. He was sitting quietly in the shelter of a wall. This illustrates an important point about mountain rescue. If military requirements dictate that a casualty must be left alone in mountainous country, his location must be clearly identified by some form of marker.

The route from the first to the second control point was over trackless mountains. We had just reached the second control point when a team member arrived with the information that his team leader had fallen and broken a leg, and was lying about a mile away. One team member had stayed with the casualty and three others, all exhausted, were still making their way to the control point. Eleven volunteers formed a rescue team to go back along the route to search for, and evacuate, the casualty. The two-stretcher ambulance was already in a pre-arranged position at the foot of the mountain with the second medical officer, who was warned to stand by and to organize a relief party of stretcher bearers. The casualty was found in 20 minutes. but the evacuation two miles down the mountain took about two hours, because of difficult country and the weight of the casualty and his equipment. In fact when the first man from the rescue team tried to lift the casualty's pack, it was immoveable. The casualty was a tough old Warrant Officer of the R.A.O.C. with a Pott's fracture. Two of his team had already fallen out, and he had added many items of their equipment to his own pack. It had to be distributed between two men before it could be moved. Even so, the stretcher with the casualty, fully clothed, wrapped in sleeping bag, blanket and ground sheet cape, all saturated with water, was an extremely heavy load. No relief team of bearers could be formed from stragglers reaching the control point in the valley; in fact, the only two men fit enough to climb the mountain and assist with the stretcher carriage were from our own detachment. Thus the second lesson learned about mountain rescue was the need for a strong rescue party (at least ten men) travelling light, and a support party with relief bearers for the final stages of evacuation.

The third lesson which should be mentioned is the paradox "There's nothing like mountain marching to make you aeroplane minded." First, to carry a loaded stretcher for two miles makes air evacuation appear more desirable and more practicable with every step. Secondly, it is of vital importance to plan equipment scales and to design equipment to reduce weight. Even ounces saved on individual items are significant. Thirdly, the absence of conventional lines of communication and supply is common to both types of operation.

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On the second morning we evacuated another major casualty with an acute hæmatemesis, but the march was almost without incident. Another team wandered from the route, was lost for 24 hours and then withdrew from the competition. The rear party shepherded two weak teams along the last few miles. Several men fell out at the control point, but there were no stretcher cases. On the third day the teams were holding together well and only three men fell out. With assistance all reached control points. The fourth and final day was an easy march without casualties, apart from a severe electric burn and shock in a member of the Control Party who was helping to push a wireless truck when the aerial touched a power line. The Cambrian March concluded Phase I of our objectives in the formation of the section. It proved that the Territorial Army needed a Mountain Rescue Section, and it confirmed that a section of a field ambulance could do the job.

The object of Phase II was to learn what special skills and special equipment would be needed. For this, a detachment of the unit went to the Lake District in September, 1960, to join in the training of the Eskdale Outward Bound Mountain School. This training, for young men aged 16½-19, is more thorough and far more demanding than that required for the Cambrian March. The Territorial Army could learn a great deal from the school training programme and instructional techniques. saw how rock-climbing techniques were taught, and in particular shared the training periods using the Thomas stretcher which is standard equipment for all mountain rescue teams. There is some confusion of terminology which must be cleared up if the R.A.M.C. is to take part in mountain rescue training. The training programme for the school included several periods of instruction on the Thomas stretcher but only 20 minutes on the Thomas splint. Bearing in mind the number of training periods devoted to the Thomas splint by the R.A.M.C., this seems very strange. In fact, the splint referred to was the splint for the Thomas stretcher, which is a double thigh splint used to fasten the patient securely to the stretcher for support when lowering down a steep slope. A Thomas splint is available but true extension is not applied and it is irreverently referred to as the single iron leg splint or, even worse, "That other thing."

The detachment spent a period doing practice descents with the Thomas stretcher on a 60-foot vertical rock face. A team of seven men is the minimum required for this work. Three ropes, preferably of nylon and 1\frac{3}{8} inches in circumference, are used for the controlled descent, one fastened to the guide and two to the stretcher. A secure belay or fastening is essential, and a snap ring (karabiner) must be interposed between the securing loop and the running rope, for nylon can be seriously weakened by friction heat. The guide grips the lower two handles of the stretcher as it descends, and can manipulate it round obstructions in its path.

The object of Phase III, to study the personnel establishment, movement and control of the section, is still a subject for experiment. It is not intended that there should be a special establishment for a mountain rescue section. It should be looked on as a normal field ambulance section which has been trained for a specialized role. It is intended that it would have the normal (war) establishment of one officer, one sergeant R.A.M.C. and 23 other ranks including attached personnel. The section can form a rescue team with a supporting element but is rather short of transport. If the

section works with the Company Headquarters, which can provide another medical officer, an administrative officer and more transport, two strong teams with transport can be formed in addition to a strong supporting element with adequate transport. This gives a well-balanced operational sub-unit. I am convinced that the section will need wireless communication for effective control. Whether the operators are attached personnel or members of the section trained in wireless procedure is a matter for experiment.

Certain items of equipment have proved particularly useful in mountain rescue. A strong stick about four feet long and 11 inches in diameter may be considered a rather unmilitary item of equipment, but issued to every man in the section, it is invaluable for mountain marching, fording streams, testing marshy ground, used as a pole for a bivouac tent or as a cross support for a loaded stretcher. The airborne type of folding stretcher weighing 17 lbs. can be carried on the march and is quite suitable for the evacuation of casualties. The Thomas stretcher is more suitable if the casualty must be lowered down a rock face but is more difficult to carry on the march. A Bergen rucksack is generally suitable for load carrying, but the carrier man-pack is very suitable for awkward loads. 1937-pattern webbing equipment is quite unsuitable. A wind-proof smock or anorak is the best clothing for mountain rescue. Vibram type rubber soles are satisfactory for normal use but not for wet rock. The 24-hour individual ration was used on the Cambrian March and was very acceptable. The ration and container weighs over four pounds and the hexamine solid fuel type "Tommy" cooker, a further 13 ounces. 4,000 calories proved more than adequate for arduous training.

It cannot be foreseen whether the Mountain Rescue Section will survive the current re-organization of the Territorial Army. It has already proved that specialized training of this type appeals to the young Territorial volunteer who can see a practical use for training that may otherwise seem too remote from his civilian experience. Mountain rescue in this country has, for a long time, been the responsibility of the Royal Air Force or teams of local volunteers using equipment provided by voluntary subscription through the Mountain Rescue Committee. With the recent interest in adventurous training for the Territorial Army, it seems quite wrong that a soldier, if he is injured in mountainous country, should be dependent on any organization other than the R.A.M.C. If this means that the R.A.M.C. must learn new skills not shown in the training manuals, it may well give a valuable stimulus to training.

I would like to thank Colonel R. C. Webster, M.D., Assistant Director, Medical Services, 42 (Lancashire) Infantry Division (T.A.) for his helpful comments. A useful book issued by the Mountain Rescue Committee, *Mountain Rescue*, 1960, may be obtained from the Honorary Secretary, Hill House, Cheadle Hulme, Stockport, Cheshire—price 1s. plus postage.

THE FIGHT AGAINST POLIOMYELITIS

A Lecture delivered at the Royal Army Medical College, Millbank, February, 1961.

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POLIOMYELITIS is an ancient disease known probably to the Pharoahs, for records of the deformity produced by muscular paralysis have been found on carvings from ancient Egypt. Yet its clinical manifestations were only separated with certainty from other neurological disorders by Heine in 1843 and the first epidemic ever to be described was that noted by Médin in 1887 in Stockholm. Wickman described the first country-wide outbreak in Sweden in 1905 and there has been little to add since to his admirable account. Yet these earlier records were concerned with poliomyelitis as a disease of infants, which justified its earlier name of infantile paralysis. In Great Britain sporadic cases and small outbreaks were reported from 1897 onwards, and the incidence rose in 1938 to a level of four per 100,000 of the population. The first large epidemic, however, occurred in 1947 quite unexpectedly. In this year over 7,000 cases were notified and still larger outbreaks were experienced in 1949 and 1950. Since then waning and waxing prevalence in Britain has compelled the conclusion that this country had begun to follow the earlier experiences of Scandinavia, the U.S.A. and Australia. These countries experienced epidemics of poliomyelitis even before 1920, and though the worst year in American and Danish history was probably 1952, the strange lack of protection afforded by epidemicity contrasted with the apparent low level of the disease in the period before outbreaks set in.

A second feature of the epidemic experiences in western countries was the changed age-incidence. Whereas the earlier experience of the disease in all these countries was dominated by the occurrence of 60 to 80 per cent of cases in children under five years of age, that of the large epidemics of the U.S.A. before 1945 and our own epidemics since then was that two-thirds of the cases occurred above this age. It was largely the occurrence of the disease in older children and adults that led to the abandonment of the name "infantile paralysis" and the substitution of the word "poliomyelitis." No explanation for the shift in age-incidence was found, however, before the extensive investigations of the serological status of the populations in many areas of the world had been accomplished, and these were made largely by Paul and his associates at Yale (Melnick et al. 1955). Indeed the puzzle was accentuated by the war-time epidemics on the islands of Malta and Mauritius in which the infants of the civilian population were exclusively affected, whereas the temporary military population in these islands including British troops and R.A.F. were attacked even though of adult age. Thus of the 426 Maltese affected only 29 were over five, but there were 57 cases in British servicemen. Even more recently outbreaks in certain South American states and in Africa have continued to exhibit infantile paralysis

with sparing of the attack on adults. It must be appreciated, however, that the adult section of our own population when once attacked exhibited a high mortality rate. so that the infant exhibits both a higher degree of susceptibility to infection and a greater resistance to neurological attack than does the adult. The strange phenomenon of a low level of endemic disease, yet a high attack-rate in temporary adult immigrants, was well shown by the comparative attack-rates in U.S. Forces in the different theatres of war (Paul, 1949). The only possible explanation of this contrast was that polioviruses are most prevalent where disease among the resident population is clinically inappreciable.

Virological explanations of the epidemiology

So long as the virologist was limited to studying polioviruses in the laboratory by inoculating rhesus monkeys and chimpanzees, it was impossible either to examine large numbers of virus strains or to investigate the level of antibodies in the blood of many patients or of healthy persons. The first step in improved ability to handle the virus in the laboratory came from the transmission of Type II poliovirus—the Lansing virus from Michigan-to the cotton rat and the mouse. Although this virus opened the way to large-scale serological study, the more important epidemic strains were known to be unrelated to it, and thus only a partial picture was obtained of the behaviour of the virus in nature. Nevertheless, these earlier serological tests using the Lansing virus adapted to mice showed that in countries such as Egypt where poliomyelitis outbreaks are exceptional, antibodies to Type II virus are rapidly acquired in infancy and persist throughout life, suggesting a high level of endemic infection. In the U.S.A., however, antibodies in young children develop at a slower rate, so that many children of school age have no antibodies. There were instances of sera without antibodies in American children and adults at all ages. Again, it was shown that antibodies were present in a higher proportion of children from an overcrowded, unhygienic area in the U.S.A. than in children from a better social and economic area. These findings hinted at the fact that epidemics of poliomyelitis were correlated in places with a slow acquisition of antibodies in the earlier years of life.

The brilliant achievement of Enders and his colleagues at Boston in adapting tissue cultures to the growth of polioviruses in the test-tube had a catalytic effect on the acquisition of knowledge (Enders et al. 1949). It had already been shown by a monumental study of many virus strains by Salk and others using monkeys that there were three major types of polioviruses distinguished on an antigenic basis. Now that in vitro methods were available for the recovery of virus strains from epidemics it was possible to confirm this on a larger scale. It was soon obvious that most of the large epidemics of poliomyelitis in modern times were predominantly due to Type I viruses. A lesser number yielded Type III viruses, and Type II infections were the least common. At the same time, antibodies against Types I and III, the important epidemic types, were studied in many different countries using neutralization tests in tissue cultures. In some American white populations as many as 40 to 50 per cent of children reached the age of 15 without developing antibodies to Types I or III viruses and similar figures were obtained in other countries such as Sweden (Melén

et al. 1958). Yet in areas where poliomyelitis was hardly ever recorded, antibodies to all three types of poliovirus rose rapidly in early infancy and were almost universal by the age of two. Thus the results with Types I and III viruses confirmed the earlier studies with Type II viruses in mice.

The picture thus revealed strongly suggests that the three polioviruses are ubiquitous and a cause of widespread infantile infection, probably in the first six months of life, largely unaccompanied by disease in countries and areas with a low standard of hygiene. In western countries the improvement in hygiene since the early part of the twentieth century has gradually led to a decline in infection in infancy and a postponement of first infection to a later age-group. Thus in these countries increasing numbers of children and adults acquire infection at an age when the central nervous system is less resistant to attack than in infancy and neurological disease is thus more likely. The process becomes a vicious circle as children are born to mothers themselves without antibodies, so that even infection in the first six months of life is more likely to be accompanied by disease.

Perhaps as a corollary to these findings, the purely epidemiological inverse correlation of the infantile mortality rate and the incidence of poliomyelitis charted by Payne of the World Health Organization may be quoted (Paul, 1958). Nature meant us to exchange our polioviruses with each other while crawling around the floor, and the well-meant efforts of our hygienists have, in fact, helped to create the problem of epidemic disease. We thus derive our infection with poliovirus from infected persons and particularly from infants and children who are excreting virus while remaining symptom-free. Although the possibility of extra-human infection also exists, as by the intermediary of meat-eating flies, it is hardly likely that such a reservoir is important except when sanitation is primitive. It is far more likely that the reservoir of infection is the human herd, through which a relatively narrow ribbon of virus spreads, particularly when seasonal conditions favour fæcal-oral transmission. The possibility of transmission by airborne droplets also exists and may in fact be the more important under certain conditions.

The mechanism of infection by poliovirus

While knowledge has been advancing on the epidemiological front, much has also been learned about the pathogenesis of infection in man. By whatever route virus actually reaches the victim, the portal of entry is believed to be the alimentary tract and particularly the pharyngeal and small intestinal mucosæ. Multiplication of virus occurs in the mucosa, and virus passes to the regional lymph-nodes but not usually to other organs. It also passes down the lumen of the alimentary tract, probably infecting other areas of mucosa, and eventually is excreted in large amounts in the fæces. In most cases these events are clinically silent, but in a small percentage they are accompanied by minor illness with symptoms such as a slight pyrexia, headache or a sore throat. In a still smaller proportion of instances, virus does pass beyond the lymph-nodes to other organs. One route is probably along peripheral nerves and another is via the blood. Viræmia has proved extremely difficult to demonstrate, because it occurs in the first few days of infection at a time when virus is also present in the pharynx, and before any symptoms are present. Though there is still

doubt concerning the exact way in which virus passes from the alimentary tract to the central nervous system (C.N.S.), there is now no doubt at all that the composition of the blood can influence the process. The introduction of antibodies parenterally in the form of gamma globulin or their stimulation by immunization with inactive virus vaccine both afford significant protection against neuroparalytic disease in animals and in man, and these favour the view that the blood-stream is an essential pathway in invasion of the nervous system.

What follows after the arrival of virus in the C.N.S. is, however, influenced by several factors concerned with both the virus and the host. First the strains of polioviruses differ in their ability to multiply and to cause lesions in the C.N.S. even after direct injection into the monkey brain or cord. Some viruses found in nature are relatively attenuated in terms of monkey neuro-virulence and others are highly virulent, spread widely within the C.N.S. and produce destructive lesions and necrosis of motor neurones. Therefore by analogy the biological properties of the infecting strain are of great importance to man. Secondly the host himself plays a significant part. Trauma, exercise, pregnancy and other metabolic changes can all predispose to an enhancement of neuroparalytic disease, and the first two may determine the site and extent of virus multiplication within the C.N.S.

The consequence of infection of the nervous system with the production of lesions is the familiar clinical pattern of paralytic poliomyelitis involving the brain stem, spinal cord or both organs. In some more fortunate persons invasion is arrested at the stage of meningeal involvement, but even in these some neurones undoubtedly suffer. The frequency with which paralysis occurs is dependent very much on the particular hosts concerned, and paralytic disease may only occur once in every 100 to 1,000 instances of infection in the average European community. In rare instances, however, as for example among the Eskimos, the paralytic attack-rate has been as high as 20 per cent of the population at risk. In more normal circumstances age is a determining factor in the host-virus relationship, and the heightened susceptibility to infection of the child or infant is accompanied by a lesser risk of death from actual paralysis than in the adult. There is no better example than poliomyelitis for demonstrating the subtle effect of those poorly-understood host factors which determine the outcome of what we naively term infection by a particular virus species.

The prevention of poliomyelitis

Efforts to limit the spread of poliomyelitis under epidemic conditions have largely failed. By the time the first case of paralysis has occurred in a family or community, familial and often extrafamilial contacts, themselves clinically unaffected, are nevertheless infected and actively excreting virus. Moreover, the paths of spread from case to case are only clearly discernible in a restricted population such as a village, and little use can be made of quarantine in urban populations. Closing schools is ineffectual once cases of paralysis have occurred, and the effect of closing swimming-baths is largely that of diminishing fatigue and its provocative action in terms of host paralysis. The banning of tonsillectomy is a wise measure, however, because the operation has been shown to be followed by an increased risk of bulbar poliomyelitis under epidemic conditions. In military communities the occurrence of poliomyelitis

is certainly an indication of the need for overhauling hygiene and for diminishing temporarily circumstances leading to muscular fatigue.

Salk vaccine

With this background of failure of normal hygiene measures it is hardly surprising that the prospect of immunization was eagerly awaited, but nothing could be done until a method of artificial cultivation of the virus was available which could provide a rich growth of virus readily separable from unwanted foreign protein. The method of tissue culture evolved by Enders and his colleagues (1949) provided just such a method, and Salk's energy and the material resources given by the people of the U.S.A. to the National Foundation for Poliomyelitis enabled mass cultivation to be achieved. Salk's second contribution was that of a practical method of inactivating the virus by incubating the virus-containing culture at 37°C. with a critical concentration of formalin. Even then the prophets might well have been sceptical that the total virus antigenic mass in a 1 ml. dose of vaccine would be enough when injected intramuscularly to stimulate the formation of antibodies. It was soon found, however, that antibodies were produced by such a vaccine, and that although primary immunization in children or adults without prior antibodies was relatively inefficient, a tremendous booster response occurred, either after a suitably spaced third dose, or with one or two doses in those who had even small quantities of preformed antibodies. These immunological findings have been widely confirmed and Salk's claims have, in general, been fully vindicated. Once it had been shown that artificial immunization with a vaccine containing all three types of polioviruses was feasible and led to the formation of antibodies in amounts comparable with those found during recovery from infection, field trials were indicated.

The famous trial in the U.S.A. organized by Dr. Thomas Francis of Ann Arbor, Michigan, gave results which exceeded even the forecast. Paralytic disease was reduced by 66 per cent or more in those children receiving three doses of vaccine at short intervals. The British experience of the effect of two doses of vaccine at three to four weeks interval using a British-made vaccine, prepared according to Salk's technique though with a substitute Type I strain, gave very comparable results to the American trial. The ill-fated experience of the introduction of mass vaccination in the U.S.A. was traced to a failure of manufacture of certain batches of vaccine. Since the process was modified and stringent tests were made for the presence of residual live vaccine after formolization, no further event similar to the Cutter disaster has been experienced anywhere in the world. Resumption of mass immunization of children and adults in the U.S.A. and its introduction elsewhere have led to a remarkable change in the incidence of the paralytic disease.

However, two weaknesses have become apparent in the Salk vaccine which have been important in the drive towards the alternative of attenuated live virus vaccine. First, the concentration of virus antigen achieved in the ordinary Salk vaccine appears adequate for the stimulation of antibodies against Type II and III viruses but is inadequate in the case of Type I virus. This is shown by the fact that about 30 per cent of children receiving three doses of Salk vaccine at the recommended intervals are still deficient in Type I antibodies. It is not enough to give a fourth dose to such



children—what is needed is a better vaccine for the basic immunization by the first two doses. There are now available better vaccines with a more concentrated Type I component, but they are expensive or not yet in good supply.

The second defect of the Salk vaccine is that it fails to immunize against oral infection of the alimentary tract. In consequence it is as easy to produce alimentary tract infection of Salk-vaccinated subjects as it is to infect normal children. There is a little evidence that vaccination may reduce the duration of virus excretion, and in this way it may upset the transmission of virus in the community. But experience in Canada and the U.S.A. has shown that if an epidemic occurs primarily in unvaccinated subjects, the fire of infection may spread to involve also those who have been vaccinated. In the sharp outbreak in Quebec Province of Canada in 1959 there were instances of paralysis in children who had received three and four doses of Canadianmanufactured Salk vaccine. It is true that the attack-rate was much lower in the immunized than in the non-immunized, but the estimate made of the so-called vaccineeffectiveness was based to some extent on speculation about the exact numbers of children in the two categories at risk. Instead of the 90 per cent effectiveness estimated during these outbreaks, it is possible that the true effectiveness is only 70-80 per cent. which was in fact found during the controlled trials of 1955 and 1956 in the U.S.A. and in Britain. At any rate, apart from the degree of effectiveness of immunization with Salk vaccine, the experience in certain American epidemics and in Israel indicated a failure of mass vaccination given during the course of the epidemic to arrest its progress.

Live attenuated poliovirus vaccines

In the last three years increasing use has been made on a world-wide scale of a living oral vaccine, prepared from various strains of the three types of polioviruses previously subjected to laboratory manipulation designed to attenuate their neurovirulence for monkeys. Three sets of such vaccines, prepared by Koprowski, Cox and Sabin, have been used. This is not the place fully to discuss the relative properties of these candidate seed viruses, but it is clear that they are not all equally attenuated in terms of monkey neurovirulence or in certain other desirable properties (Report of the Expert Committee of W.H.O. on Poliomyelitis, 1960). What has been learnt is that when given by mouth, large doses of these tissue-culture viruses produce infection of the alimentary tract in children, lead to the development of neutralizing antibodies and cause excretion of virus in the stools for two or more weeks. Contagion of those in intimate contact with the vaccinated subjects has occurred, but there does not appear to be any widespread infection of the community. Vaccinated subjects who have been infected are immune to re-feeding within short periods of time. The viruses excreted by the vaccinees differ from the parent vaccine strains, and in a low percentage of instances they show a degree of reversion towards monkey virulence of a level found in natural wild viruses. In general, however, they are still 1,000 to 10,000 times less neurovirulent than ordinary viruses recovered from paralytic cases of poliomyelitis.

The vaccine prepared from Sabin's seed viruses has been most widely used, having been given by mass methods to many millions of children and adults in Russia, Czechoslovakia, Hungary and certain American communities. No harmful effects

have been reported either in vaccinated persons or their contacts. Similar good results have been obtained with Koprowski vaccine which has been used widely in Poland and the Congo. The Cox-Lederle vaccine has been used in South America, in the U.S.A. in Minnesota and Florida, and in Europe in West Berlin. The only possible adverse effects were noted in Florida and West Berlin, where the vaccine was used in the face of undue prevalence of poliomyelitis. Events in these areas indicate the extraordinary difficulty of disentangling the origin of cases of polio in immunized communities. In no case has it been possible to prove more than a possible association of the cases in time with the use of the live vaccine. Infection by epidemic strains could equally have been the explanation. Nevertheless, because the Cox viruses appear in comparative tests to be less well attenuated in monkey-virulence than the Sabin viruses, their use is likely to diminish.

Now although these massive experiences have shown the general safety of live vaccines, it cannot be said that there is equal proof of their effectiveness. The vaccine does not "take" in those who have previously been infected by natural means and thus no antibody rise occurs. The proportion of those who are immunized is claimed to be high as shown by antibody tests, particularly if multiple doses of trivalent vaccine or the three types separately are used. There have been instances where live vaccine has been given in the face of outbreaks of poliomyelitis. impressive results achieved were those reported from Singapore by Hale and coworkers (1959). The Sabin Type II vaccine used in the face of a Type I outbreak could be traced subsequently in the community. It did not give rise to cases of poliomyelitis. It appeared to cause a real fall in the incidence of poliomyelitis in those to whom it was given, after three, but not within two, weeks from its administration (Hale, personal communication). In some countries such as Czechoslovakia and certain Baltic states poliomyelitis has been at a very low level since mass immunization with Sabin vaccine. Much more time is needed, however, before it will be known whether the vaccine can stop an epidemic or can eliminate poliomyelitis from a community. The claims of the proponents of live vaccine verge on the extravagant, and it is hard to preserve a balanced point of view.

Conclusions

For the people of our country subject to normal risks of infection it appears that either inactivated or live vaccine would probably furnish a good basis for protection. It is clearly unwise to substitute live for inactivated vaccine without more careful ground-work. But for those, such as the military, whose risk of infection may be many times greater in tropical climates than at home, it appears to me that it is unwise to rely solely upon one form of immunization. A combination of three doses of inactivated vaccine at the usual intervals followed by feeding on at least two occasions with live attenuated vaccine would be worthy of exploration and may, I suppose, receive attention by those responsible for the Army's health.

In all this long history of research on poliomyelitis one is conscious of the word "risk." Risk from the disease if nothing is done, risk from an imperfectly-prepared vaccine if this is used. Our thoughts should turn from risk to safety. How remarkable has been the general freedom from reaction after the Salk vaccine! How amazing to

hear of 70 millions given the Sabin vaccine in the U.S.S.R.! As with all new remedies, new prophylactics must be judged by practical experience before we crow over their effectiveness. The elimination of a disease not dependent upon an intermediate vector is a very hard feat to accomplish. Perhaps this will happen in the case of poliomyelitis, perhaps it will not.

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DUODENAL ULCER IN SOLDIERS

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In the last war peptic ulceration was responsible for as many discharges from the armed Forces as were actual wounds and was only surpassed by psychiatric casualties. This is in contrast to previous wars including the 1914-18 war when this disease was not a serious problem. Peptic ulcer remains one of the major medical problems in the Army, for men may be required to serve in outstations abroad, far from a hospital with facilities for adequate radiological examination, or where blood transfusion or surgical treatment are difficult. This problem is shared with the other fighting services, the Colonial Service and many commercial undertakings. In the Army the rate of invaliding for peptic ulcer in 1958 was 1.1 per 1,000 male other ranks, a rate exceeded only for psychiatric disorders.

In order to review this problem 100 soldier patients with radiologically proven duodenal ulcers were investigated at the Queen Alexandra Military Hospital, Millbank. There is a tendency in the Service to invalid men with ulcers, if the diagnosis is made in the early years of their engagements. This has the result of artificially dividing duodenal ulcer patients in the Army into two groups, those within three years of joining and those who have had many years of service. There are differences between these groups, and so 50 from each group comprise this series. It is interesting that 80 per cent of the young men had developed their symptoms in civil life. Indeed four of them had had symptoms since childhood, and one had had a hæmatemesis at the age of 14. The majority of the older men were seen between the ages of 30 and 40 and had on average 16 years' service each; they were often key men, excellent soldiers, ambitious and with heavy family responsibilities.

Aetiology

It is now generally accepted that duodenal ulceration is a genetically determined condition. In this series no less than 48 per cent of the young soldiers gave a positive history in first degree relatives, indeed many of their fathers had undergone partial gastrectomy, compared with 18 per cent of the older men. In both groups 54 per cent of the men belonged to blood group O, compared with 46 per cent of the general population. Two of these young soldiers were identical twins with identical histories and identical barium meal radiographs. Though duodenal ulcers appear to have a hereditary basis, the symptoms are commonly precipitated by stress, and the degree of stress required varies greatly. In the young group there were three main causes of stress, frustration with army life (28 per cent), army diet (24 per cent) and family worries (24 per cent). In the older group the predominant cause of stress was family worry (38 per cent), and in a surprising number divorce proceedings had precipitated symptoms. These in turn often followed long periods of family separation. After domestic worry came periods of intense work (24 per cent) in men who often

seemed over-conscientious, had worked long into the night in preparation for such things as the Suez expedition or various state ceremonial occasions, or on intense courses followed by examinations on which the man's future depended. Another 10 per cent blamed the army diet for their symptoms. Though the army food is excellent, much is fried in response to popular demand and is thus quite unacceptable to these men. They had had no symptoms while living in quarters or at home, but when they moved into barracks the fried food quickly caused pain. Frustration with army life played no part in causing breakdowns in these long-term soldiers. In many cases the causes were multiple and in others less obvious. The following history is illustrative:

A sergeant was posted to a Kenya outstation and took his wife. They had more money than they had ever had before, a pleasant bungalow, a servant, and a car. Neither he nor his wife had ever lived outside a city; they became bored and frustrated and his wife never ceased to grumble. The sergeant developed a duodenal ulcer, but his symptoms were immediately relieved on stepping off the aircraft at London Airport.

These findings are in accordance with those of Tidy (1941). He found no evidence that war itself increased the incidence of peptic ulceration in soldiers but that the main precipitating factors were irregular meals and the stresses engendered by separation from home and family. He also noted that symptoms had originated in civil life in 92 per cent of these men.

Diagnosis

The outstanding fact revealed in this series was that in 80 per cent of the patients the diagnosis was obvious from the history, provided adequate time and care was taken in obtaining it. Thus the pain was gnawing and annoying, dull or aching in 74 per cent, and burning in 10 per cent. Others described it as a nauseating pain or even as a panic feeling. The pain was localized in the epigastrium in 88 per cent, relieved by food in 84 per cent and by antacids in 88 per cent, at least until the final and most severe stages. The pain was periodical in 94 per cent and woke the patient in the early hours of the morning in 69 per cent. There can be few diseases with such a constant clinical pattern. In the other patients the pain was usually suggestive of duodenal ulceration, for though the character or site varied, the time relationships were preserved. In only one patient was a hæmatemesis the first symptom of a chronic ulcer.

It has been suggested that duodenal ulceration is particularly common in cadaverous anxious men. Davies and Wilson (1937) described the typical duodenal ulcer patient as being thin in the face, sharp of nose, spare featured, sparely built and having an air of aggressive alertness. Such a description did not fit the vast majority of these patients. 72 per cent were noted as having excellent physiques and many were athletes, some of distinction. It was not uncommon for a large, tough rugby player to be admitted with a severe hæmatemesis, and some of the patients were Commandos. These soldiers were more in keeping with Lord Moynihan's (1932) description of the duodenal ulcer diathesis as occurring in men of vigour, strength, athletic habits and often of some prowess. It is sometimes difficult to

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convince medical boards that a really healthy, burly, athletic young man is unacceptable to the Army because of a duodenal ulcer. Only 13 of these men conformed to the asthenic type. The prevalent mental type was the sensible, well-orientated man of above-average intelligence. Although 30 per cent of the younger men appeared anxious, only 16 per cent of the older men openly worried but many of them admitted to being worriers over trivial things and perfectionists in their work.

In the confirmation of the diagnosis examination of the stools for occult blood was little help. The fractional test meals revealed hyperchlorhydria in 82 per cent of the younger men and in 72 per cent of the older men. Unfortunately hyperchlorhydria was also common in a parallel series of patients with dyspepsia due to other causes. The barium meal was reported as normal on the first occasion in no less than 34 per cent of the older men, only for a duodenal ulcer to be demonstrated on later occasions. The history obtained from one man was of interest in this respect:

This man, aged 22 years, had all the clinical features of a duodenal ulcer. His father, who had served in the Navy, had suffered from similar symptoms for many years and during his time in the Service had had many barium meal examinations, all of which were reported upon as normal. On leaving the service he continued to have pain, and repeat barium meals were performed in several civilian hospitals; each time he was told that no ulcer was present. Finally after a severe hæmatemesis a large ulcer was found at operation 20 years after his original symptoms had begun.

Complications

These duodenal ulcers in soldiers are of serious significance. Twenty-two patients had either hæmatemesis or melæna, and ten of the ulcers had perforated.

Discussion

Two of the main problems arising with duodenal ulcer in the services are diagnosis and treatment. It is generally recognized that even under the best conditions an ulcer crater can only be demonstrated in 60 per cent of duodenal ulcers. It is true that in others local tenderness, spasm, or distortion due to scarring are helpful, but these too may be absent. The problem of the man with a typical history and negative barium meal is very real, especially if he is due to be posted abroad. One may have to decide the balance between the chances of malingering and the danger of sending a man to an area where blood transfusions and surgical facilities may be unsatisfactory. The finding that in the older group of men there were no less than 34 per cent in whom the original barium meal was negative underlines the difficulty, while the high rate of complications underlines the danger. This relatively high ratio of negative findings may be due to the fact that in the Army such patients are seen in hospital earlier than they would be in civilian life. Avery Jones (1949) has drawn attention to this problem and believes that such patients probably have subacute ulcers which tend to recur later with undoubted evidence of peptic ulceration. In another series of patients who had suffered from gastrointestinal bleeding with originally negative radiological findings, among 143 followed up 17 were later found to have a chronic duodenal ulcer (Avery Jones, 1959). The value of the clear-cut, stereotyped history in 80 per cent of the present series is evident.



Medical treatment for duodenal ulceration is unsatisfactory. In a ten-year follow up Martin and Lewis (1949) found that though medical treatment relieved symptoms only 32 per cent of patients treated medically were apparently cured, and Ogilvie (1953) quoted almost exactly similar figures. Rae and Allison (1953) concluded that the natural history of the disease was not materially influenced in sailors by prolonged medical treatment.

It is, however, widely recognized that at least in certain patients the removal of a non-recurring precipitating stress may result in cure, and so a knowledge of such stresses, which in a homogenous population like the Army are remarkably constant, is of great importance in assessing the prognosis and the need for surgery. In some the genetic factor may so predominate that the mildest stress will provoke symptoms, while in others a severe upset such as divorce proceedings may be needed. In the hereditary group medical treatment has little chance of success, and there is nothing more demoralizing for a keen soldier than long periods in a low medical category with promotion barred to him. Indeed the frustration aroused frequently leads into a vicious circle, and early surgery is probably the best course.

Lastly it is obviously important that young men with duodenal ulcers should not be recruited for the fighting services or for other occupations in which they will be required to serve far away from hospital facilities. It has been shown that 80 per cent of the young soldiers in this series had had symptoms before joining the Army. It is admittedly a difficult problem, but it should be possible to eliminate more of these young men before they embark on such unsuitable careers.

Summary

One hundred soldiers with duodenal ulcers have been investigated. This is a disease of special importance in Service life. The problems of diagnosis and the ætiological factors of importance in treatment and prognosis are discussed.

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SIR WILLIAM LEISHMAN

(1865 - 1926)

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NORMAL VARIATIONS IN LEUCOCYTE COUNTS

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THE Seventh Revised Report of the British X-ray and Radium Protection Committee (1948) includes recommendations on the acceptable state of the blood of persons employed on X-ray or radium duties, and details of the medical supervision of similar personnel in the Army are also laid down (War Office, 1957). These include total and differential white blood cell counts, with standards as follows:—

	Total count	Polymorphs	Lymphocytes	Abnormal
		•		Cells
Limits of normal	4,500-12,100	2,250-8,200	1,100-3,800	Nil
Warning level	4,500	3,000-(2,500*)	1,000	Nil
Rejection level	3,000	2,000	750	Present

^{*} Under 19 years of age.

Scrutiny of such counts shows that apparently healthy men often have polymorph counts below the warning level and sometimes below the rejection level. Several repeat counts may show similar figures, but medical examination of these men reveals no clinical abnormality. The variation in consecutive white blood cell counts in normal men with duties involving no exposure to radiation was therefore investigated in 1956 and 1957.

Methods

Leucocyte counts, both total and differential, were done hourly for twelve hours on two successive days on 69 volunteers. The men were doing the full range of duties in seven military hospitals and so it was impracticable to do counts for 24 consecutive hours. Two hundred cells were counted usually by the same technician in each centre, all of at least three years' experience. Sometimes the full 24 counts per man were not possible owing to unforeseen commitments; only 57 men had the full series carried out, giving a total of 1,643 counts performed instead of 1,656. The average age of the men was 20 years; 65 (94 per cent) were 19 to 22, the remainder being 18, 23, 24 and 30 years old.

Results

The total count was below 4,500/mm³ once only in three men and in 11 cases the count fell below this figure more than once, to a maximum of 15 counts in one man. Similarly polymorph counts were below 3,000 once only in six men, more than once in 37, and in all the 24 counts in two men; and lymphocyte counts were once below 1,000/mm³ in two men, and in one man twice. Only once was a lymphocyte count below 750/mm³. The normal distribution is shown in Figure 1.

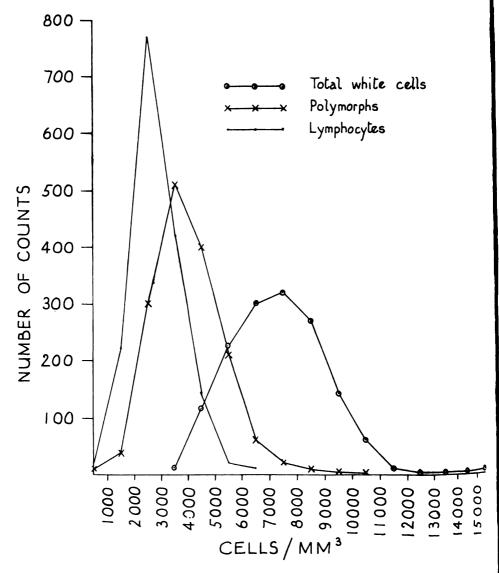
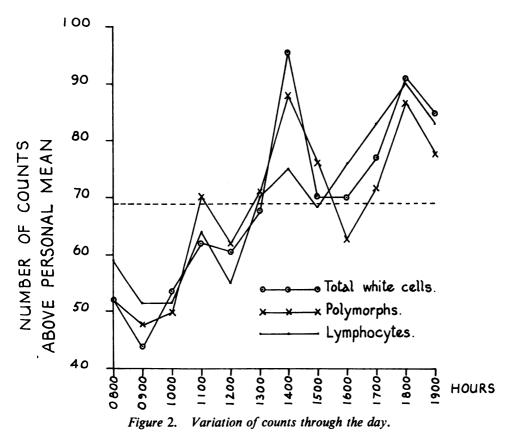


Figure 1. The distribution of counts

Previous studies of variation through the day have taken an average of the counts in all the subjects. The variation is better displayed by noting the spread about the mean of each man, as in Figure 2. The curve is evenly distributed about the ordinate of 69 counts, i.e., assuming no variation through the day. The pattern shown in the total polymorph and lymphocyte counts is striking and corresponds closely. The curves show an overall rise through the day, with peaks at some time before 0800 hours, and at 1100, 1400 and 1800 hours. The usual mealtimes of these men, varying within narrow limits, were breakfast 0720, a Naafi break 1015, lunch 1240 and tea



1640 hours. Figure 2 suggests most strongly that the peaks are connected with food, the rise beginning about one hour before a meal and reaching a peak one hour after.

Discussion

The normal leucocyte count has been studied in several large series, some of which are compared in Table I. It is obvious that a single leucocyte count in any patient must be interpreted with some caution.

Physiological variation in white counts has given rise to a large literature. Garrey and Bryan (1935) reviewed the subject, giving nearly 300 references. They discussed many factors; posture, exercise, training, digestion, starvation, climate, adrenaline, epilepsy, pregnancy and labour, and emotions. They thought it established that the count was lowest and least variable in the morning with rest, and digestive leucocytosis seemed a doubtful entity. Sabin et al. (1925) charted quarter-hourly counts over seven or eight hours in six people. They found the highest level to be in the afternoon, whether food had been taken or not. Kennon et al. (1937) found in a closely similar series non-rhythmical oscillations in the counts and no evidence of digestive leucocytosis.

Chamberlain and Turner (1951) of the Atomic Energy Research Establishment (A.E.R.E.) carried out an exhaustive statistical review of hæmatological techniques

and records. They found that with reasonably careful techniques a coefficient of variation of under 10 per cent in leucocyte counts, and of 12 to 15 per cent in neutrophil and lymphocyte counts, was attainable. Greater accuracy in routine counting was of little use, for the physiological variations are much larger than the technical errors. They did counts at 9, 10, 11, 12, 2, 5 and 6 o'clock on each of three successive days on seven subjects (a total of 147 counts) who were performing normal duties but no heavy work. Four subjects showed a marked rise of leucocytes during the day on each occasion, two showed no particular trend, and one showed a marked fall on two days with no trend on the third. The average of all subjects is shown in a figure on which data obtained by Shaw (1927) in a similar series of five subjects are also shown. In both of these series there is a gradual rise in total cells, polymorphs and leucocytes throughout the day, except for the polymorph curve in the A.E.R.E. series which is almost level.

The findings in the present investigation agree in part with these reports by other workers. There are marked fluctuations in the total number of leucocytes and this is reflected in the polymorph count. If the figures are analysed for each subject then the lymphocyte curve closely parallels the others. This method of illustration is based on the hypothesis that each man has his own normal mean count, differing from others. The degree of variation in individuals in this series corroborates the findings of Sabin et al. (1925), being considerably wider than those reported by Kennon et al. (1937). This study bears out the conclusion of Sturgis and Bethell (1943) that any changes in the leucocytes, especially when they are within the range of normal, or moderate in extent, should not be interpreted as due necessarily to any single or constant physiological or pathological influence unless the trend is a uniform one in multiple experiments.

TABLE I. NORMAL LEUCOCYTE COUNTS

Authors		Osgood et al. (1939)	Blackburn (1947)	Chamberlain & Turner (1951)	Jeffrey (Present series)	TOTAL OF MEAN
Nationality		American	Australian	British	British	_
Number of subjects		269	642	3,098	69	4,078
Number of counts		269	642	3,098	1,643	5,652
TOTAL	Mean	7,350	7,372	7,741	7,650	7,528
	Range	4,400-13,200	2,360-20,000	4,500-12,100*	3,050-15,800	2,360-20,000
Poly- morphs	Mean %	53.9	55.3		55.6	54.9
	Mean number	4,010	4,104	4,685	4,049	4,212
	Range	1,000-11,000	802-13,320	2,250-8,200*	896-10,660	802-13,320
Lympho- cytes	Mean %	38.1	36.9	_	39.5	38.2
	Mean number	2,760	2,650	2,253	2,813	2,619
	Range	700-6,500	798-6,500	1,100-3,800*	658-6,300	658-6,500

^{* 95} per cent range



White blood cell standards for those working with radioactive sources. Chamberlain and Turner (1951) concluded that six-monthly routine blood counts did not afford much protection to individuals exposed to sources of radiation, and the present investigation bears out this contention. If the recommendations already referred to are carried out, particularly those laid down by the War Office (1957) that a fall in the count below the warning level indicates that an individual must be removed from all contact with radioactivity "until he has been found fit to return to duties including exposure to radioactivity," much manpower will be unnecessarily lost. No firm guidance is given for deciding when a man is fit to return to such duties. Presumably further counts must show acceptable levels with no clinical evidence of disease. If, however, an experienced radiographer frequently shows polymorph counts below the warning level, with the total white cell count occasionally below 4,500, must he cease to be employed in this trade? Two illustrative cases follow:

Sgt. S. for over a year had routine counts with polymorphs consistently below 3,000/mm³ and hourly counts for eight hours on two successive days in June 1957 showed the same finding on all but one occasion. Repeated clinical examination revealed no abnormality and the radiologist, in consultation with the physician, decided that his continued leucopenia was not in any way due to his employment.

Sgt. D. for four months showed a polymorph figure below 3,000, once below 2,000/mm³. Hourly counts for twelve hours on two successive days showed polymorph counts below 3,000 on two occasions. Repeated clinical examination showed no evidence of disease.

It would appear logical and reasonable to carry out blood examination, particularly the examination of a stained film, on all individuals about to take up duties connected with radiation and periodically while they are so employed, to exclude pre-existing or coincidentally-arising blood disease, particularly leukæmia, in view of the possible medico-legal aspects should any one employed in such duties develop a blood dyscrasia. It would appear, however, that little weight should be given to the actual numbers of white cells found on such an examination provided they fall within the wide limits shown in Table I. With the development of film badge services, the actual exposure to radiation should be the basis on which to regulate employment, for the white cell count fluctuates so widely that little, if any, reliance can be placed on it as regards the degree of over-exposure commonly met.

Summary

The results of 1,643 total and differential white cell counts performed on 69 men are reported. The extensive literature on the subject of physiological variations in white cell counts has not been fully reviewed, but articles which appear pertinent have been consulted. The normal ranges of white cell counts shown by four series of counts reported in the past two decades are very wide. The daily variation in counts in the present series shows a gradual rise from morning to afternoon, and a digestive leucocytosis does occur in contrast to the conclusions of several authors from 1925 onwards.

The white cell count fluctuates so widely, and lower limits are encountered so often in normal people, that little if any reliance can be placed on such counts for the protection of persons whose duties involve exposure to radioactive sources. Routine

hæmatological investigation is still necessary to exclude blood disease, especially leukæmia, owing to the medico-legal aspects. It is evident that little emphasis should be placed on a single white count in a patient, for the normal varies so widely. Laboratory results must be correlated with the clinical examination.

My thanks are due to the many army pathologists and technicians, too numerous to name, who collaborated in the collection of the material and in part of the mathematical work involved in the analysis. The work would not have been possible without the willing co-operation of those who volunteered to have the numerous counts done on them. Mr. Rosenbaum of the Statistical Department of the Army Medical Directorate and Lieutenant-Colonel H. W. Whitcher, R.A.M.C., have kindly perused and commented on this article.

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THE NEUTRON HAZARD

Lieutenant-Colonel J. A. H. BROWN
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Army Medical Liaison Officer

Medical Research Council Radiobiological Research Unit, Harwell

ONLY in the last few years has radiation come to be considered the most likely major cause of casualties from nuclear weapons in a future war. When the first atomic bombs were used against Hiroshima and Nagasaki most casualties were due to mechanical injury and burns, and it is estimated that only 5-15 per cent of fatal cases were due solely to radiation (U.S. Atomic Energy Commission, 1957). Probably as many as 30 per cent had received fatal doses of radiation, but the immediate cause of death was generally injury caused by collapsing buildings, missiles or other secondary factors. Casualties due primarily to radiation were, therefore, a relatively slight proportion of the total, although the novelty of this type of injury attracted wide publicity at the time. Also at that time the nuclear armament was somewhat limited as to size of weapon, and efficient detonations had not been achieved with a yield very different from 20 Kilotons or "Nominal bomb" level. The introduction recently of weapons with very large and very small yield has entirely altered the situation, because both primarily produce a radiation hazard.

The megaton weapon or hydrogen bomb has resulted in the possibility of large areas being affected by radioactive fall-out. This may produce casualties many miles downwind from the explosion and well beyond the range of the blast or heat effects. Relative to these blast or heat effects the effective distance to which ionizing radiation, other than that due to the fall out, extends is small. It goes little beyond the fire ball and can for practical purposes be disregarded. Radiation will be delivered from fall-out remaining on the surface of the ground and undergoing radioactive decay. This may well cause medical problems less familiar to us than acute radiation sickness, though this may also occur. These problems, however, are unlikely to be of importance in a strictly military sense. Although the megaton group of weapons might be used strategically and are the principal civil defence problem, their direct use against armies in the field would seem unlikely except for the purpose of denying ground, because they are really weapons of mass destruction most likely to be used against densely inhabited areas.

There now exists, however, a quite different weapon, recently evolved. This is the small nuclear weapon for a tactical role with a yield in the sub-kiloton range. It can be used on the battlefield by a small group of men, and because of its low yield its effect is felt only up to several hundred yards' radius. The heat and blast effects extend for a shorter distance than the ionizing radiation, and the radiation differs also from that of other nuclear weapons in that neutrons are a more important component than gamma rays. Neutrons, unlike gamma radiation, penetrate dense materials well but are stopped by the nuclei of light elements, such as hydrogen.

Both the military use and the peculiar biological problems which neutrons present are due to this.

Even where the radiation is from a small weapon the possibility of the radiation dose being largely due to gamma rays cannot be discounted entirely, as shielding might in certain circumstances produce this effect. Very little is known about the effect of neutron radiation from bombs on man, except that comparisons of the incidence of leukæmia in Hiroshima and Nagasaki have shown quite marked differences, possibly due to the types of weapons used and differences in their neutron output. On the other hand, a lot of data have now accumulated from experimental work on animals (Vogel et al. 1957).

The Biological Effect of Neutron Radiation

Both neutrons and gamma rays produce ionization within the tissues with consequent release of free radicles. Structural damage to chromosomes and rupture of large protein molecules also occur. The ionization which neutrons produce in tissues are grouped more closely together than ionization due to gamma rays. This higher ionization density of neutrons is perhaps specially damaging to the cells, and may be the reason why to produce an equivalent effect locally a larger dose of gamma radiation is needed. The neutrons also give rise to gamma rays by interaction with the tissues as they lose energy, but only quite a small proportion of the effect of neutrons is due to these rays.

These basic radiobiological differences between gamma rays and neutrons are not the only relevant factors. One major difference in the biological effects of these radiations in the whole organism depends on a purely physical process—their penetration into living tissue. Even neutrons with high initial energies, such as those produced by fission, rapidly give up their energy and penetrate very much smaller distances into the tissues than does hard gamma radiation. This effect of depth does not matter much in an animal as small as the mouse, but in one as large as a man most of the dose will be delivered to the superficial layers and the internal organs will receive much less radiation than they would from an equivalent dosage of gamma rays. In the past most neutron studies have been carried out using mice (Upton et al. 1956) and other small animals (Swift et al. 1958), and the different pathological effects produced have been compared with those of 250 KVP, or Cobalt 60 gamma rays. Quantitatively the ratio of neutron dose to X-ray dose needed to produce the same effect has been known as the relative biological efficiency (R.B.E.) of the radiation. For effects such as the production of sterility (Neary et al. 1957), cataract (Ham, 1953), loss of thymic (Jordan et al. 1956) or testicular weight (Kohn et al. 1954), neutrons have been several times more effective than X-rays, and the R.B.E. has therefore been well above unity. Relative biological efficiencies should, however, ideally be compared only where there is homogeneous irradiation with a pure radiation source. Neither of these conditions is met in a comparison of neutron and gamma radiation effects using fission neutrons. If, on the other hand, one considers large animals, there is little evidence that neutrons are more effective than other types of radiation in producing acute effects (Bond et al. 1956). Furthermore the pathological



effects produced do not always seem to be exactly the same as those produced by X-rays or gamma rays. For these reasons we may choose to compare the results of irradiation of large animals by different radiations by a rather less exact but more meaningful expression known as the potency ratio. "This requires nothing more than expression of the dose to be used in the comparison" (Alpen et al. 1960). In my opinion the dose should be expressed as exposure dose not tissue dose.

It is generally considered that the mid-lethal dose for man (LD50), i.e. the dose that will kill half of those exposed, is about 450 rads for hard X-rays. Bomb neutrons are probably no more effective than this for producing acute lethality in man, i.e. their potency ratio is not more than unity. For other effects, such as the production of cataracts, the figure may, of course, be much higher, as much as ten if the organ is situated near the surface. This is almost certainly a depth dose effect. In my opinion the mathematical comparison of ratios for effects which may be slightly different is not often helpful, and further work on this subject is indicated.

Pathology of Neutron Irradiation

It has been shown that, to damage the gastrointestinal tract of most animals, doses of X-rays in excess of the LD50 must be administered. Severe damage to the gastrointestinal tract results in early death of the animal, occurring perhaps five to eight days after the radiation (Alpen et al. 1958). Should the animal survive this, death results from bone marrow failure and failure of immunity later on, often in the second or third week. Neutron irradiation usually follows this pattern in rodents, in that it produces acute hæmorrhagic lesions within the intestinal tract with death in about five or six days. Should the animal survive this, however, it may not die of bone marrow failure but will continue to live, surviving the acute syndrome. Dogs on the other hand which survive the first week may still die from bone marrow failure later (Alpen et al. 1960). There is still insufficient information to know what will be the effect on man.

It has been suggested that as bone has a relatively low hydrogen content, the absorption of neutrons and therefore the energy within it and the adjacent marrow is low compared with that in the soft tissues. Thus even in a homogeneous radiation field the gut would receive a relatively higher dose of irradiation than the hæmopoietic tissues (Nowell et al. 1956). To express this quantitatively, it appears that the potency ration for gastrointestinal effects is near 2 for fission neutrons in either rodents or dogs, and for bone marrow effects is likely to be around 0.8 or 1. There is some evidence also that rodents receiving neutron irradiation and surviving the acute stage will develop a high incidence of tumours of the gastrointestinal tract (Nowell et al. 1956), but this has not been confirmed. This would point to some special effect of neutrons on the gut. Observations on the cells of the duodenal epithelium of mice have shown that after neutron radiation there is very much less recovery than after X-rays (Lesher and Vogel, 1958). It appears that neutrons produce a very much larger number of chromosome breaks that cannot be repaired and the cells die. Mitosis is much delayed. This leads to disintegration of the crypts and disorganization of the villi. Where the original crypts have disintegrated, masses

of chromatin fragments accumulate in the crypt spaces, and where new crypts are slow in forming, the covering of mucous cells sloughs off.

The Military Medical Problem

The medical officer is faced with the problem of treatment of gastrointestinal radiation casualties in the field if small tactical weapons are used in a future conflict. The energetic treatment of these casualties might well be most rewarding, if the radiation dose is predominantly due to neutrons and is not too high, because these casualties may not necessarily suffer bone marrow failure and failure of immunity later. If on the other hand the radiation is predominantly due to gamma rays, such treatment can be of little avail, for a dose high enough to cause the gastrointestinal syndrome is likely to be followed by marrow failure and death.

My thanks are due to Dr. R. H. Mole for reading this paper and making helpful suggestions.

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THE TEACHING OF DERMATOLOGY IN THE ARMY

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Until the Second World War, it was the custom in the Army, and to a great extent in civil life, for dermatology and venereology to be studied and practised by the same person, a custom which still pertains in some European countries. Syphilis was then a common disease, and its skin manifestations were protean. Furthermore, several of the drugs used in the treatment of syphilis produced toxic or allergic effects on the skin. Thus dermatology in the Army tended to be practised by officers who were primarily venereologists, and as a result there was little formal teaching of dermatology as a separate subject though between the two wars a Dr. H. MacCormac did, from time to time, lecture to medical officers on courses at the College.

During the First World War, however, a number of officers were employed wholly in the treatment of skin diseases. Among these was Major H. MacCormac, already a prominent London dermatologist and later to be recognized as one of the leading dermatologists of his generation. The tremendous manpower wastage caused by skin disease in war had been observed, not only by Sir John Pringle in the 18th century, but also by medical officers serving in the Napoleonic Wars. These facts were well recognized by medical administrators of the South African and First World Wars; but the losses from enteric diseases in the former and the frightful carnage of the latter must have overshadowed the losses from dermatoses, and doubtless fully occupied the energies and attention of medical personnel. MacCormac (1917) pointed out that these matters were better ordered in the French and Belgian Armies, who set up dermatological centres with the result that their losses from skin disease were less than ours. He wanted to set up "scabies stations" in each Army Corps in France, but was met with a blank refusal on the grounds that the "overheads" of personnel (quartermasters, clerks, cooks, etc.) would not justify it. This was no doubt true, but in the more enlightened administration of our generation, it is difficult to see that there was really any problem. Had the same situation existed in, say, 1944, the dermatologist with a few orderlies would simply have been incorporated as a "wing" of an existing C.C.S. or F.D.S. without increased administrative "overheads" resulting. MacCormac ends his address to the Royal Society of Medicine with these words: "It is not everyone who is able to appreciate what may be done for men with skin complaints, and how considerable a number of them can be returned to duty. They are not merely 'uninteresting cases.' There is not perhaps the glamour and excitement associated with their treatment that some appear to derive from attendance on wounds. Surely they have suffered for their country as much as others; surely it is our duty as well as our privilege to give them of our best without stint and without reserve." It is a sobering thought that it required the passage of another 25

years and the outbreak of another world war, before any real consideration was given to these problems which MacCormac tried so hard to solve.

During the 1914-18 war, extensive research into scabies was carried out by Captain J. W. Munro, R.A.M.C., in Professor Nuttall's laboratory at Cambridge (Munro, 1919). Much new information was gained, including many basic facts concerning the life-history and entomology of the Sarcoptes. The author acknowledges his indebtedness to Colonel Sir William Horrocks and to Major W. C. Smales, D.S.O., for their help, and "for removing many difficulties arising from the military nature of the investigation."

Between the wars, the danger of dermatology becoming too narrow a speciality began to be apparent in civil life, and the teaching hospitals began to demand that their dermatologists should be fully trained as general physicians. When the Second World War broke out, these same standards had not yet been implemented in the Army, but it was not long before events were to take place which materially raised the standards of dermatology in the Army. In the recent Prosser White Oration, Dr. D. M. Pillsbury of Philadelphia paid tribute to the direction of special subjects in general, and dermatology in particular, by a system of specialist Advisers. He regretted that the U.S. Forces took so long to implement the same system, and went on to emphasize the benefits which the system had conferred not only on military dermatology at the time, but on civil dermatology after the War. The first Adviser in Dermatology to the War Office, Lieutenant-Colonel (later Brigadier) R. M. B. MacKenna, was appointed in 1942. To him, military dermatologists owe a debt of gratitude which can never be fully repaid. As far as the British Army is concerned he may be justly called the father of military dermatology. Warmly supported by his colleague in venereology, Brigadier T. E. Osmond, he insisted that dermatology should become a speciality separate from venereology, so that the talents of the best dermatologists recruited from civil life should be utilized to the full. He insisted also that ill skin patients needed skilled nursing just as much as other ill patients. During the 1914-18 war, skin patients had been nursed by female nursing Sisters, but the practice had tended to fall into abeyance between the wars. At MacKenna's insistence it was re-introduced. These two measures alone reduced considerably the morbidity from skin diseases and consequently man-power wastage, which at the time was beginning to alarm the Army Medical Directorate. Brigadier MacKenna also lectured on tropical skin diseases as part of the wartime course on tropical medicine in the College. He prepared a Memorandum on Cutaneous Diseases which was issued to all medical officers.

After the war the system of advisers was continued, and these officers have held appointments on the College staff. Systematic clinical teaching in dermatology has been given regularly to officers of the Senior, Junior and National Service Courses, and to student nurses. During the last few years a collection of colour photographs of skin conditions has been built up for teaching and record purposes. The Advisers have also been responsible for the supervision of the training of young officers in the speciality. In this respect it is a pleasure to record the generous help and encouragement given to us by Dr. R. M. B. MacKenna and Dr. G. B. Mitchell-Heggs, our two civilian consultants, and by Professor G. H. Percival and Dr. G. A. G. Peterkin at the Royal Infirmary of Edinburgh. Since 1948, no officer not possessing the M.R.C.P.

diploma has been appointed to the grade of Senior Specialist. The opinions of our dermatologists are widely sought throughout the world and several have held university appointments in overseas stations.

While taking pride in our achievements in the past, we must look to the future, and it is my belief that the College will have a part to play which will be greater than ever before. With a small army widely dispersed in small garrisons throughout the world, it will be impossible to have an experienced dermatologist in every station. This means that all medical officers, specialist and non-specialist, will have to possess a greater knowledge of dermatology than at present. It will be our duty here to teach them.

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TRAINING ARMY ANÆSTHETISTS

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Adviser in Anæsthetics

ANÆSTHETICS is, as everyone knows, a young specialty, and although since 1920 it has been included in the subjects recognized for specialist training for Medical Officers attending the Senior Course at the Royal Army Medical College, little encouragement, before World War II, was given to officers to specialize in anæsthesia. In those days any medical officer was considered to be suitably trained to give "open ether," and the surgeons themselves practised spinal and local anæsthetic techniques extensively. There were very few appointments for specialists in anæsthetics. As late as 1939, for example, the establishment for specialist anæsthetists for the whole of the Army in India allowed for only four, one in the principal hospital in each of the four Commands, and two of these posts were usually held by officers of the Indian Medical Service.

The onset of World War II changed the picture, as the urgent need for competent anæsthetists in the Army soon became obvious. Under the wise and able direction of Brigadier Ashley Daly, Consultant Anæsthetist to the Army throughout the war years, an anæsthetic service was progressively organized and equipped. Consultants were appointed in each theatre of war, training centres were set up, and the classification of "specialist anæsthetist" was limited to those officers who had the necessary academic distinction and mature practical experience. By 1943 the practice of anæsthetics in the Army had reached a high peak of efficiency.

When the war was over and demobilization began, it was not long before the Army Medical Services found themselves dangerously short of experienced anæsthetists, and attention was directed to providing all possible facilities through the Royal Army Medical College for post-graduate training in anæsthetics. In 1947 Lieutenant-Colonel W. H. Scriven, M.B.E., R.A.M.C., became the first Adviser in Anæsthetics at the War Office, and on the retirement of Brigadier Daly, Dr. Bernard Johnson, Director of the Department of Anæsthetics at the Middlesex Hospital and later Dean of the Faculty of Anæsthetists of the Royal College of Surgeons of England, was appointed Honorary Civilian Consultant in Anæsthetics to the Army. Lectures on anæsthesia were given to both Junior and Scnior Courses at the College, and certain military hospitals received approval as training centres for the Diploma in Anæsthetics, the then accredited higher qualification in the specialty.

At the present time, a medical officer selected as a trainee in anæsthetics is posted to the Royal Army Medical College as soon as the opportunity occurs, for post-graduate study and attendance at special courses organized by the Faculty of Anæsthetists and elsewhere, with the object of preparing him for the Primary Examination for the F.F.A.R.C.S. diploma. Four military hospitals at home and overseas are now approved for training for the Final Examination for F.F.A.R.C.S., and the trainee in due course is directed to one of them. Upgrading to Junior Specialist

status and finally to Senior Specialist require the approval of the Council of the College, and the regulations for this advancement are framed to insure that the Army Senior Specialist in Anæsthetics is in all respects the equivalent of his civilian counterpart in the National Health Service, the Consultant Anæsthetist.

This system of intensive post-graduate training and control has resulted in the maintenance of the high standard of anæsthesia in the Army achieved during the war years, and there is every hope that this will be continued in the future.

We have coined an aphorism in the fantastic new world of Whitehall defence technology: if it works, it's obsolescent:—Sir Solly Zuckerman.

Discussion in medicine expands to fill the space made available by lack of data.

— Dr. A. G. Spencer.



THE MAMMOTH OF MILLBANK

Private P. J. CATTERICK

R.A.M.C.

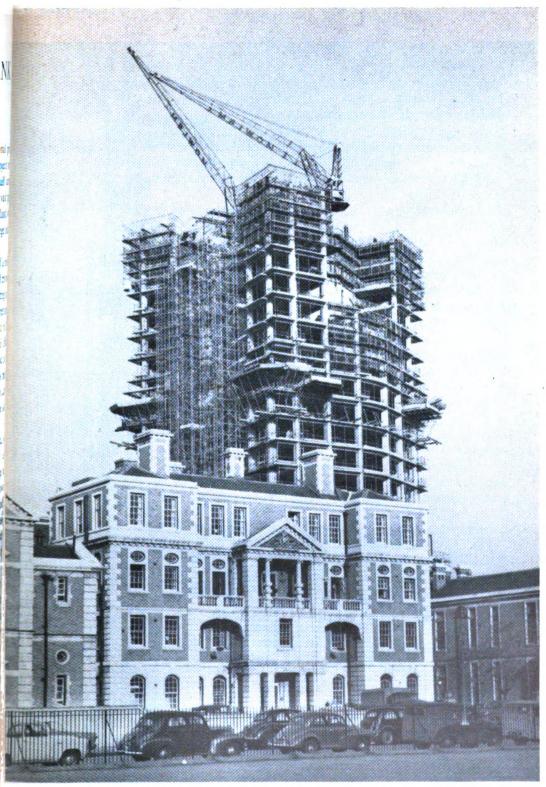
MILLBANK has been attracting a great deal of attention from the national press in recent months, not for the Corps on this occasion, but for a building project next to the Queen Alexandra Military Hospital. The site covers three and a half acres of Crown property and was once part of the Millbank Penitentiary. This vast prison stretched to the other side of Vauxhall Bridge Road, and included the land where now stands the Hospital, the Tate Gallery, the Royal Army Medical College and the Headquarter Mess.

Built in the early part of the last century, the penitentiary cost over half a million pounds before it was completed. It was shaped like a six-pointed star, and provided accommodation for 600 prisoners of both sexes, many of whom were waiting to be deported to the colonies. John Howard and Elizabeth Fry were two of the reformers who were connected with Millbank, and it was partly due to their efforts that in 1816 it became the first prison in the land to appoint a regular governor, medical officer, chaplain, and lady matron. Trouble broke out at one time with a riot, and in the 1830's there came over from America the idea of total isolation. During this period cell windows were blocked up, prisoners were exercised blindfolded, and even during religious services they were screened from the chaplain, so that they could be alone to meditate on their sins, free from the contamination of their colleagues.

In about 1860 the land behind what is now the Queen Alexandra Hospital was leased out for 99 years to Mr. John Mowlem, a building contractor, who used it as a main depot for his expanding business. The site was not an easy one to manage and history records two tragic occasions when the area was flooded by the overflowing River Thames, 50 yards away. In the first incident horses used for towing vehicles for the company were drowned in their locked stables, and on the second occasion tenants perished when they were trapped in a basement by rushing flood waters. Part of the land was used at one time by Speakers of the House of Commons, first to stable their horses and later to garage their cars.

In 1959, when it was time for the contractors either to surrender their lease or to take out a new one, it was agreed to develop the site. Plans were drawn up and the London County Council agreed to a £5,000,000 programme which would include both residential and office accommodation. The main feature is a fully air-conditioned tower block. Thirty-four storeys high, it will be the tallest building in London and one of the tallest in Europe. The lay-out and in particular the proposed location and height of the block resulted from the restrictive Town Planning angles imposed on the north and south boundaries, which forced the bulk of the development towards the river frontage on the east. It would also form a visual stop to the existing cliff effect along both sides of this stretch of the river. The demolition and clearing of the site were started shortly after the plans were passed, and building began the same year.

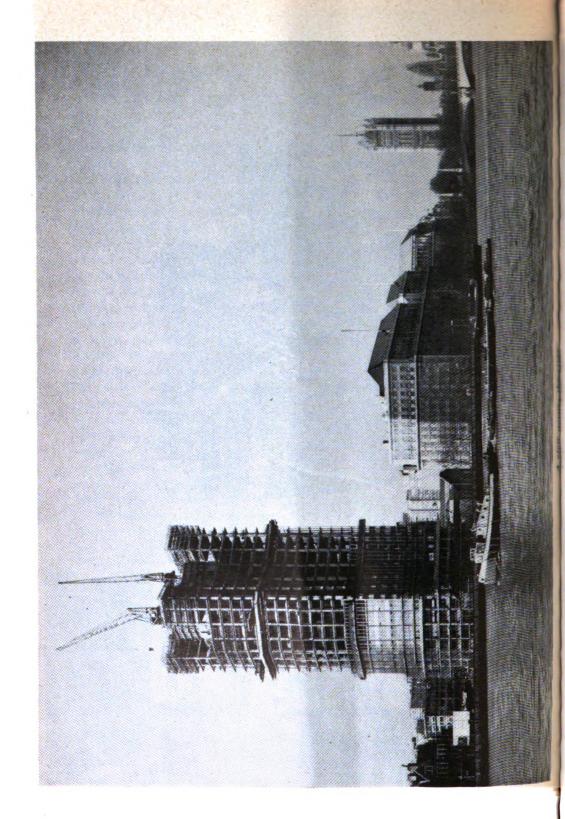
When it is completed, the tower roof will be 387 feet above ground level. In comparison St. Paul's Cathedral is 370 feet high, and the Victoria Tower of the Houses



D. E. Tomkinson, A.I.B.P.

The tower begins to rise behind the Queen Alexandra Military Hospital

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of Parliament is 340 feet. At present the contractors are working on the 31st floor of the tower, and they expect that the structural skeleton will be complete by the end of May. It is said that on a clear day the building can already be clearly seen from Hampstead Heath and from Epsom Downs which are about 20 miles away. Besides the tower, the development will contain an eight-storey Y-shaped block of offices and a twelve-storey block of flats. These are expected to be ready in the spring of next year. There is also a three-tier covered car park, a conference hall, ample court-yards and gardens, and a low-level podium linking the tower and the Y-block along the Millbank frontage.

The development has been commissioned by the Vickers Group of companies and is being sponsored by the Legal and General Assurance Society Ltd. The contractors hope to finish their task, the biggest building project they have undertaken for many years, in the autumn of 1962. At that time Vickers hope to move their entire staff from their existing headquarters near Victoria to fill only a part of the premises. The rest of the office accommodation will be let out to other firms. At present over 500 people are employed on the site in order to complete the contract on the scheduled date, but they have been faced with a number of difficulties. An immediate problem was that of sinking safe foundations. Ninety-foot piles three feet thick had to be bored into the London clay within a watertight cofferdam to prevent flooding. The superstructure of the building is mainly concrete reinforced in situ, and is thus unlike the skyscrapers of New York which have steel superstructures allowing movement in strong winds. The concrete, however, will move some distance at the top, two and a half inches, that is, of course, if it is hit directly by a hurricane.

Luxuries are not excluded from this 20th-century wonder and one of the main features is a lift service which will travel at a speed of up to 800 feet per minute. Another interesting fact is that only a few of the many thousand windows in the tower open, and then only in an emergency. Apparently a light wind at ground level becomes a gale near the top of the tower. If windows were opened, everything would be blown off the desks.

To some people this new marvel in construction appears hideous, to others it is æsthetically inspiring. As they work beneath its shadow during the day, its two giant antennæ move majestically around 400 feet above them. As they pass it at dusk it gazes down on them with a thousand glittering eyes like a creature from the imagination of H. G. Wells. One thing above all is certain, they cannot ignore it.

THROPS

IT seems that in south east Asia after the Second World War, the staff of the Medical Directorates were unduly prolific with reports of new tropical syndromes, insisting that a proper vigilance be maintained. Medical memoranda reached medical officers in the field so thick and fast as to induce a certain indifference. A tendency to uniformity in the description prompted a medical officer with time on his hands to concoct a typical example for fun. The draft found its way by accident to a typist and from there on it went smoothly through the usual channels, evading the scrutiny of hygienists, administrators and, some say, even the consultant staff. Within a week of its promulgation, cases of the dread new disease began to be notified. We understand that when the whole affair was discovered and officially clarified, the General Officer Commanding obtained copies of the relevant correspondence for his private files. We are grateful to Colonel M. H. P. Sayers, O.B.E., for bringing this matter to light now, although he has been able only partly to unravel the origins of the affair. Any of our readers who may know more of the story will, we hope, divulge their secrets now. We have tried to reproduce faithfully the original document, which, of course, has not hitherto appeared in print.

ALL MED UNITS ALL R.M.Os.

373/15/Med. HQ 34 Ind Corps. K.L. 15 Oct 45.

Subject:—NOTIFICATION OF DISEASE—THROPS

Herewith copy of 14 Army letter No. 2877/10/Med 5 dated 11 Oct 45, forwarded for information.

(Signed) M. C. Kelly, Lt. Col. for Brigadier.
DDMS, HQ 34 Ind Corps.

RJC/AR 15/10

Copy to:—A.D.M.S. 25 DIV. 453 SUB AREA C.A.S. (M)



TEL: 6493

No. 2877/10/Med 5. HQ Fourteenth Army S.E.A.C. 11 Oct 45.

To:—D.D.M.S. 34 Corps.

A.D.M.S. 23 Div.

A.D.M.S. 5 Div.

A.D.M.S. 2 Area

S.M.O. 5 Para Bde.

Subject:—NOTIFICATION OF DISEASE—THROPS

Herewith a copy of an account of a Tropical disease—Throps.

Please be on the look out for the a/n disease and notify it's occurrence to this H.Q. on A.F.A.—35.

Sd.XXXXXXXXXXXXXXX Brig.

DDMS. Fourteenth Army.

SUBJECT:-THROPS

Cases of Throps are now beginning to recur in this area, and attention of all Medical Officers is drawn to the possibility of such cases occuring in this particular district. Throps, which is almost entirely restricted to the Southern half of BURMA, has not been seen since the retreat from BURMA. At that time, there was a small epidemic among the Senagalease Labour Battalion working on the Hmawbi-Budalin Road. That the Japanese had many cases is made clear from Hanseatic documents which show that in the Shawlu Valley in one Butai alone there were no less than 123 cases.

Some Medical Officers may not be familiar with this disease which is therefore described in some detail, below.

Geographical Distribution. Restricted to a BURMA and to a small district in MALAYA, East of KUALA LUMPUR.

Actiology. The causative organism has never been isolated but is thought to be a Rickettsia similar to that causing Proya Fever. This Rickettsia has as its host the small "Eye Fly," that dwells on Carrom Grass/Grass may easily be recognised by its typical feathery vectules. The route of infection from the Fly to the induvidual has never yet been satisfactorily established, but soyagesa, working in MALAYA in 1941 suggested that it was through the hair follicles of the eyelids and eyebrows.

Morbid Pathology. At post mortem the only constant findings are those of severe Toxaemia. However, Probyn (1943) reports widespread and minute Haemorrhages in the Circular Gyrus similar to those found in Arnica's Encephalepathy. Hitherto there is no confirmation of this.

Incubation Period. 2 to 24 days.

<u>Clinical Manifestation</u>. The first symptoms is a peculiarly severe preorebital headache, which is very characteristic. This may continue for several days until the cerebral symtoms appear. These take the form of profound mental depression, so much so, that in this stage patients may commit suicide. At the same time the patient appears to suffer intolerable irritation of the bladder with consequent frequency of urine.

Clinically the most striking feature of this disease is the characteristic pose adopted by the patient—his head thrust forward and a peculiar glitter in the eyes. On Ophthalmoscopy, the disc appears blurred and arteries and veins are indistinguishable. At or about the 6th day, when the irritation begins, there is a fine squamous rash on the trunk and eyelids.

The only certain diagnosis feature is the temperature chart. Here there is a progressive fall of Temperature, which may drop as low as 94.6 to 95. In spite of this, the patient may feel warm and even throw off blankets.

Toxaemia increases and at the end of the third week the patient gradually succumbs.

Arsenic injections have been given without benefit although there does appears to be a place for intramuscular injections of stiboline 0.02 cc. administration of standard pyretics may be of assistance.

Prophylaxia. Clearing of areas where there is Carrom Gra may prove too difficult but liberal spraying with DDT should be undertaken. Each individual in the area should be issued with a small container and if possible an individual sparklet.

SUMMARY. Throps is again beginning to become a medical problems in S. BURMA. The condition is caused by a Rickettsia and clinically may easily be recognised by the characteristic appearance of the patient and by the typical temperature chart. Also by death supervening at the end of the third week. Isolation of the patient and energetic countermeasures should be taken and noted on AF A—35.

SIR JOHN GOODWIN

K.C.B., K.C.M.G., D.S.O.

SIR John Goodwin, Director-General of Army Medical Services from 1918-1923 and a Governor of Queensland, died on 29th September 1960 at the age of 89.

Thomas Herbert John Chapman Goodwin was born on the 24th May, 1871 at Kandy, the eldest son of Surgeon Major John Goodwin, who was then serving in Ceylon. He was sent to his family home at Highweek, Newton Abbot, Devon, and was educated at Newton College. He gained the English Conjoint qualification in 1892 from St. Mary's Hospital, Paddington, and was commissioned into the Army Medical Service the following year. At Netley he came third in his group and he soon distinguished himself as staff-surgeon to the Mohmand Field Force on the North-West Frontier of India; he was mentioned in despatches, and for gallantry at the battle of Shabkadar in the Tirah campaign, he was appointed to the Distinguished Service Order. In 1897 he married Lilian Isabel, daughter of James Ronaldson of Howick Grange, Northumberland. He was stationed at Quetta before the Great War and Sir Henry Holland recalls him¹ as "a tremendous sportsman." It seems he used to race two horses, was a very fine shot, and "quite a wizard as a fisherman." He used to go to the Mission Hospital for practice in types of major surgery not available to him at the military hospital.

"I quite well remember on the first three occasions when he himself operated we had, as was usual, a short prayer before he operated, to which Goodwin made no comment. The next day I was going to operate myself, and I said 'I hope you don't mind, old man, if I do it. I promised the relations I would.' Then I put up the same short prayer and saw a smile come over Goodwin's face. 'What is it?' I said. 'Oh nothing,' he replied, 'only I am so relieved that you pray when you yourself operate. I thought it was only when poor devils like me from outside did the job that you said God help them!'

In the war of 1914-1918 he at first commanded No. 4 Field Ambulance which was attached to the Cavalry Division and took part in the retreat from Mons. He was then appointed A.D.M.S. of the 2nd Cavalry Division and went through both battles of Ypres and the fighting on the Somme and the Marne. He was three times mentioned in despatches and in 1915 was appointed C.M.G. He also commanded No. 14 General Hospital at Wimereux. In 1917 he was recommended by his friend Major-General O'Donnell in France to accompany Mr. Balfour's mission to the United States of America as representative of the Army Medical Department. In this capacity he greatly assisted co-operation between this country and the U.S.A., and when American doctors came to join the war he already had many friends among them.

In 1918 at the age of 46 he was appointed Deputy Director-General of the Army Medical Services and then succeeded Sir Alfred Keogh as Director-General. He was appointed C.B. for his services and in 1919 promoted K.C.B. He received widespread recognition for his ability and outstanding services. He was Honorary Surgeon to the King and an honorary Fellow of the Colleges of Surgeons of England, Edinburgh,

¹ Brit. med. J. (1960). 2, 1529, Nov. 19.

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Australasia and America, an honorary Freeman of the Society of Apothecaries of London, a Knight of Grace of the Venerable Order of St. John of Jerusalem and a Commander in the French Legion of Honour, the Belgian Order of Leopold and the Italian Order of the Crown. He was made an honorary D.Sc. by Oxford and an M.A. of Michigan University, and was awarded the Belgian Croix de Guerre and the American Distinguished Service Medal.

After five years as Director-General, Sir John retired, but in 1927 he started a fresh career, being appointed Governor of Queensland. From 1928 to 1932 he was (the first) Colonel-Commandant of the Royal Army Dental Corps and from 1932 to 1938 of the R.A.M.C. In 1932 on retiring from Queensland he was promoted K.C.M.G. Sir John is survived by Lady Goodwin; they had no children. His younger brother. Colonel W. R. P. Goodwin, once an assistant Director-General of the Army Medical Services, died in 1958.

The picture of General Goodwin is taken from the portrait by Maurice Greifenhagen in the Headquarter Mess, R.A.M.C. Notices to which we are indebted have appeared in the Army Medical Services Magazine² the Lancet³, The Times⁴, and the British Medical Journal⁵ besides more personal accounts by Sir Henry Bashford⁶, F.R.C.P., and Sir Henry Holland¹, C.I.E. We are greatly indebted to Lieutenant-General Sir James Hartigan, K.C.B., C.M.G., D.S.O., for the following note.

"The official career of the late Sir John Goodwin has been fully recorded in the lay and medical press. I have been asked to add a few words regarding the man in his private capacity. This I do with some misgiving, as I write entirely from memory, and as one gets old memory cannot always be relied on.

"John Goodwin was a man of much charm and of attractive appearance added to by his white hair which developed early in life. His career in the Corps was meteoric and he must have been the youngest D.G. in its history. While he was in that office the Great War came to an end. The post-war period was a difficult one for the Director General. Economy was then uppermost in the minds of the Government, and Goodwin was under constant pressure to cut down expenditure as ruthlessly and urgently as possible.

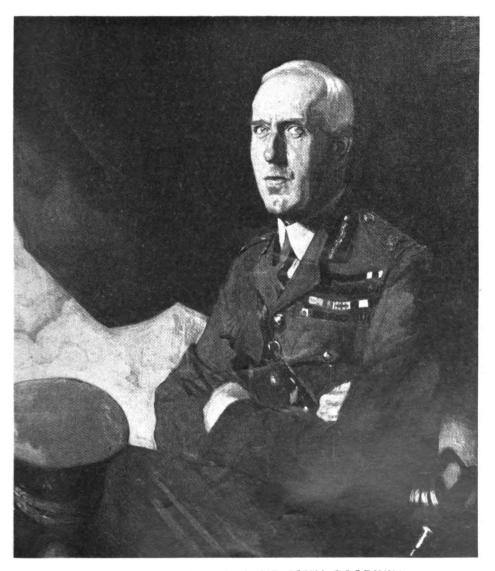
"Sir John's appointment as Governor of Queensland gave much satisfaction to the Corps. He was very popular with the Queenslanders, one of whom told me some years later that he was one of the most popular Governors they ever had. Goodwin was fond of relating that while at Brisbane he had the pleasure of welcoming Miss Amy Johnson at the end of her famous flight from England. She stayed a few days with the Goodwins and impressed everyone most favourably, being seemingly unconscious of having achieved anything unusual.

"On return to England they took a charming place in Wiltshire about five miles from Devizes with a small partridge shoot attached. This latter gave Sir John immense pleasure and he spent much of his time on its care and development. I remember

² Army Medical Services Magazine (1961). XIII, 1, 13.

³ Lancet (1960). 2, 821, Oct. 8.

⁴ The Times, Oct. 3, 1960, p.17. ⁵ Brit. med. J. (1960). 2, 1242, Oct. 22. ⁶ Brit. med. J. (1960). 2, 1319, Oct. 29.



LIEUTENANT-GENERAL SIR JOHN GOODWIN



MAJOR-GENERAL D. C. MONRO

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spending a very pleasant day with him walking round the shoot. It was the hatching season and he seemed to know the exact location of every nest. He was very generous in his invitations to shoot, especially to the young officers of the local depot to whom he gave much encouragement. About that time he wrote a book on how to organize and run a small shooting which was very well reviewed by the sporting press. In his voung days he was a keen horseman and was at one time master of the Quetta hounds.

"Both he and Lady Goodwin loved their home in Wiltshire and I am sure they both hoped they would end their days there, but it was not to be; Hitler arranged it otherwise. When during the last war the chauffeur and maids left for war service, the Goodwins tried for some time to carry on alone, which meant among other things that he had to ride a bicycle to Devizes twice a week to procure supplies. They soon found it was more than they could manage, and they moved into a hotel in a local town. I well remember his letter describing his feelings at the time. It was the last letter I received from him, and owing to my return to Ireland on retirement we never met again.

"Sir John Goodwin added lustre to our Corps. A man of the highest integrity, he was greatly respected by all with whom he came in contact, and it was the general belief that he held in a marked degree the trust and confidence of his Sovereign.

Major-General D. C. MONRO

C.B., C.B.E., F.R.C.S.

A full obituary notice appears in the Army Medical Services Magazine, in addition to those in The Times,2 the Lancet3 and the British Medical Journal.4 We are pleased to print the address given by Sir Heneage Ogilvie, K.B.E., F.R.C.S., at the memorial service for General Monro.

"I am honoured to be allowed to speak of my friend Jock Monro in the Chapel of the Corps that he loved, to which he devoted his life, and which today remembers that life with gratitude. Many of you can speak of General Monro from longer acquaintance and more intimate knowledge. None can speak with greater admiration or more real affection.

"I knew he was a New Zealander, that he qualified in Edinburgh, where his forbears had been among the most notable surgical dynasty in history. I knew of his service in India, where he made many friends, and whence he brought many stories in the telling of which his unique gifts as a mimic were seen to advantage. There is no doubt that his service as Consulting Surgeon in the Middle East was his finest hour. He had a wonderful opportunity, and he was without question the man for that opportunity. Like most men who have risen magnificently to a historic occasion, he had trained himself for such a moment, and was ready for it when it came. He had made himself an excellent surgeon, one with the basic soundness of the Edinburgh training, and the balanced judgment of one who had faced many problems in the

Army Medical Services Magazine (1961), XIII, 2.

² The Times, Dec. 8, 1960, p.21. ³ Lancet (1960). 2, 1355, 17th Dec. and 1407, 24th Dec.

⁴ Brit med. J. (1960). 2, 1810, 17th Dec. and 1893, 24th Dec.

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past, talked them over with others, made his own decisions and acted upon them, and pondered earnestly afterwards on the lessons he had learned. He gained the patient's unquestioning trust before operation: he kept this friendship for the rest of his life.

"Friendship was one of Monro's great gifts, based on that blend of charm and sincerity that was uniquely his. The task allotted to him, to direct, advise, and administer the most brilliant group of surgeons that have ever been assembled, would have been impossible to anyone but such a man; a man with a sure grasp of surgical principles, a knowledge of the lessons of previous wars, and the know-how of a trained administrator, enabling him to strike a balance, as he often had to do, between what was desirable and what was possible with the time, the equipment and the personnel available; a man with the gift of leadership and the knack of getting what he wanted, in supplies out of the Army and in co-operation out of the civilians, just because he was so keen, so genuine, and so obviously right.

"I took over from him in August 1942, but I had already had a chance to study his problems and his methods, and to pick his brains. In June, when the campaign in Abyssinia was petering out in a series of mopping-up operations, I asked leave from my Director of Medical Services to fly up to Cairo and learn what I could. I was with Jock nearly a month. We were going to Tobruk, but the time was not one for visitors, and the fortress fell when I was on my way back to Kenya. I accompanied him to most of the General Hospitals in the Canal Zone, in Palestine, and in Syria. It was time well spent. I learned much, communicated in his inimitably humorous way, of the discipline of a huge force, and of the art of man-management at which he was such a master.

"Jock's greatest contribution to military surgery was the Field Surgical Units. I do not know to what extent he invented them or to what extent he sowed the seed and let them invent themselves. He sent out the first pioneers, surgical specialists like Bob Kellar, Peter Ascroft, and Ian Aird, much as Noah sent his dove from the ark, to see what was possible, to do it, and to report back. He then called a round table conference at which the final design was worked out. He had one thing in plenty, young surgeons of the right sort. Of the men he picked and trained in 1942, eight are now University Professors in Surgery. He found them. He gave them the job. And he inspired them with his own enthusiasm and his own indomitable spirit.

"As I stand in this chapel, hallowed by the memory of so many fine soldiers, I think Wordsworth's lines are particularly appropriate to the man whose memory has brought us together to-day.

"Who is the happy Warrior? Who is he
That every man in arms should wish to be?
It is the generous spirit, who, when brought
Among the tasks of real life, hath wrought
Upon the plan that pleased his childish thought...
Who, doomed to go in company with Pain,
And Fear, and Bloodshed, miserable train!
Turns his necessity to glorious gain;
In face of these doth exercise a power
Which is our human nature's highest dower."

LETTERS TO THE EDITOR

From Major-General F. M. Richardson, C.B., D.S.O., O.B.E., O.H.S., M.D. Sir.

During efforts to increase the number of subscribers to the Journal 1 often come across a point of view which is worth considering. Suggestions that it is an R.A.M.C. Officer's duty to support the Journal, just as all officers do in other regiments and Corps, are often met by the reply that our Magazine gives us the regimental side of life and the Journal must stand or fall by its ability to compete with other purely professional journals in its appeal to officers who, in these days of rising subscriptions, can afford to take only a few such journals. Many say that it does not do so.

There has been a marked military note in many recent contributions, but now that promotion examinations are once again a serious consideration, I wonder if the time has come to encourage contributors to write the type of article on the training and operational side of our work which before the war was one of the main sources of information for those who had to take these examinations

Another point on which I feel strongly is the value to the life of any journal of an active correspondence section. However difficult this may be in a quarterly journal, I think that it should be attempted.

My final suggestion is for administrative officers. As Director of Medical Services B.A.O.R. I send copies of the *Journal* to the medical services of five of our Nato allies with whom we have dealings. The subscriptions are paid for from a private fund raised by sweepstakes and so on. It may be difficult to keep up these subscriptions, but there is an idea here for other administrative officers with un-audited money to burn, and for neighbouring medical schools, British Medical Association branches and so on to benefit. That is to say "benefit," so long as the Journal is worth reading which depends on all of us.

HEADQUARTERS.

I am, etc.,

BRITISH ARMY OF THE RHINE. 7th February, 1961.

FRANK RICHARDSON.

From Captain Frank Scott, M.B., B.S., R.A.M.C. Sir,

Whilst I was Regimental Medical Officer of the Depot Brigade of Gurkhas from 1957 to 1960 I got the impression that Gurkha infants were considerably smaller at birth than British ones. In order to confirm this I collected the birth weights of all infants born during the time I was there, together with all records available on 2/2 Gurkha Rifles and 1/10 Gurkha Rifles. This amounted to just under 1,000 children. These I have graphed by 4-oz. stages, taking from 4½ to 9 lbs. There were 38 children outside this range, varying from 1½ to 12 lbs., but the graph shows that the bulk of infants are between 53 and 81 lbs with a sharp rise and fall at these points, and the mean is about $6\frac{1}{2}$ to $6\frac{3}{4}$ lbs. From experience I noted that the progress of children over the weight of 4 lbs. was quite uneventful, and I feel that, as far as Gurkha infants are concerned, I would not class one as being premature above this weight.

PRIVATE MAIL BAG 2019, LAGOS, NIGERIA 13th January, 1961.

1 am. etc..

FRANK SCOTT.



We are very grateful to the Editor of the *British Army Review* for permission to republish the following letter from W.O.II R. F. Miles, R.A.M.C.; it appeared in October, 1960 (No. 11) p. 87.

Sir.

Captain J. G. Jones's letter in the Correspondence Section (Sep. 59) was extremely interesting and has prompted me to point out that the position of non-commissioned personnel is far more unsatisfactory. To quote Captain Jones's own words, "one of the greatest causes of discontent today is the slow advancement and lack of achievement." This is particularly so with the keen career soldier, who spares no effort to reach the top of the ladder only to find, to his complete disillusionment, that despite the very rosy picture produced to encourage recruiting, technical ability and qualification are taken as a very poor second to general seniority of service and promotion rolls.

The general public are constantly told that the modern Army requires the best type of man with the best qualification, but basically, with the highest possible qualifications, he still has to await his turn on the promotion roll below less qualified men.

Personally, having served continuously for the past 20 years, since enlisting as a bugler at the age of 14, my ultimate aim has been to gain a commission in my own particular Corps. After having obtained my full military qualifications, I studied over a period of four years, at my own expense, to gain four civilian qualifications. I cannot now obtain any higher qualifications, but my efforts have been in vain as I cannot visualize obtaining a commission before I am over 40 years of age—a course of events which would probably have taken effect without the benefit of my civil qualifications.

Captain Jones implies that at 40 years of age the future of the officer, after approximately 20 years' service, is not too bright, but at least such an officer has been able to apply the best of his youth for the benefit of the Service, whereas the keen other rank has had to spend the same period of time fighting his way up from the bottom of the ladder and is only likely to reach commissioned rank when youth has passed him by. The average soldier in my position would, I am sure be quite satisfied to be in Captain Jones's position and, taking into consideration the difference between the benefits applicable to retired officers and non-commissioned soldiers, would be happy to face civilian life as a retired major and positively delighted to retire as a colonel!

The Army is my career and I have no desire to change, but I am positive that I am not alone when I say that the present promotion system does not cater for an ambitious soldier and requires radical overhaul to encourage the regular soldier, promote recruiting and provide for a better Army.

I have personally encouraged men under my command to become regular soldiers, and have pointed out that there is nothing to stop them gaining the same qualifications as myself, but it is somewhat disheartening to be asked where precisely, after 20 years' service, have my own efforts got me?

No. 1 Hygiene Wing, R.A.M.C., B.F.P.O. 53.

R. F. MILES, W.O.II., R.A.M.C.

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WAR OFFICE COMMENTS (on W.O. Miles's letter overleaf)

O.R. Career Prospects—The present system of promotion has been in use in the Army for many years. It is based upon seniority tempered by merit and subject to qualification and recommendation. It has been found by long experience to be the fairest and most efficient method, taking all factors into account. It must be remembered that academic and technical qualifications are not the only requirements for the successful exercise of command at a high level. There are others equally or more important such as character, integrity, leadership, and manmanagement, which are developed by experience.

The speed of promotion in the Army is carefully watched and steps are taken to eliminate promotion blocks if these occur. Overall the speed of promotion has appreciably increased; under present conditions a soldier should be able to reach the highest rank commensurate with his ability during the course of a normal engagement. For those of outstanding merit there are facilities for accelerated promotion and the recent introduction of the Technician Scheme provides very quick promotion for the highly skilled tradesmen.

The career prospects for the regular soldier in the R.A.M.C. have been considerably improved specially in regard to the opportunity of reaching the rank of Warrant Officer and appointment to a commission.

O.R. Commission Prospects—Arrangements which have been in existence for many years provide opportunities for regular other ranks to obtain commissions both during the early years of their service, i.e. within the twelve years' service point, and beyond that point. Prospects for selection for a commission are better now than ever before, particularly for combatant commissions from the ranks at an early age.

Short Service Combatant Commissions may be granted to regular other ranks with less than twelve years' service, i.e. between the ages of 18 and about 30. All may apply for Regular Combatant Commissions, after six months commissioned service at regimental duty.

Regular Quartermaster Commissions are granted to selected Warrant Officers and R.Q.M.S. Short Service Quartermaster Commissions may be granted to selected Warrant Officers and R.Q.M.S. with more than twelve years' service, and in special cases Warrant Officers with over twelve years' service may be granted Short Service Combatant Commissions. Whilst holding either of these types of commission these Warrant Officers are eligible for selection for Regular Quartermaster Commissions.

ACADEMIC ACHIEVEMENTS

Major-General W. R. M. Drew, C.B.E., Q.H.P., F.R.C.P., gave the Lettsomian Lectures this year before the Medical Society of London at their house in Chandos Street. He was asked to choose a subject in the field of tropical medicine, and he lectured "On Pestilence, Great and Small." In the first he spoke of the history of tropical medicine from the time of the Society's foundation by John Coakley Lettsom in 1773; and of cholera, its history and his own clinical experience. The second lecture was devoted to smallpox. Sir Philip Manson-Bahr, C.M.G., D.S.O., F.R.C.P., in proposing a vote of thanks praised the outstanding men of the R.A.M.C. from whom he had always received the warmest support; ever since he first met the lecturer he had thought he might go a long way and he was gratified to see the position he had attained. Brigadier R. J. G. Morrison, C.B.E., M.D., F.R.C.P., said that the illustrations of smallpox must be the best which had ever been seen and that both lectures had entertained and delighted the Society. He therefore seconded the vote of thanks, and the President, Mr. Nils Eckhoff, M.S., F.R.C.S., declared it carried by the acclaim of the large audience.

THE HALLETT PRIZE

This has been awarded to Captain W. C. MOFFAT, R.A.M.C., at the recent examination for the Primary Fellowship. The prize was founded in 1927 with the money originally intended to form a retirement present to Mr. Hallett, who had been the Secretary at the Examination Hall since the conjoint board was founded in 1884, and was also Director of Examinations at the Royal College of Surgeons. On being informed of the proposed presentation, Hallett requested that the money be used to form a prize to be awarded to the most outstanding student. It is believed that this is the first time that an officer of the R.A.M.C. has gained this distinguished award.

J. C. WATTS

M.R.C.P.

Captain D. BARLTROP, M.B.

F.F.A.R.C.S.

Major F. C. SHELLEY, T.D., M.B.

Captain R. F. KNIGHT, M.B.

F.R.C.S. (Ireland)

Major P. K. COAKLEY, M.B.

M.R.C.O.G.

Major W. A. KIRKPATRICK, M.B.

Captain G. M. JOHNSTONE, M.B.

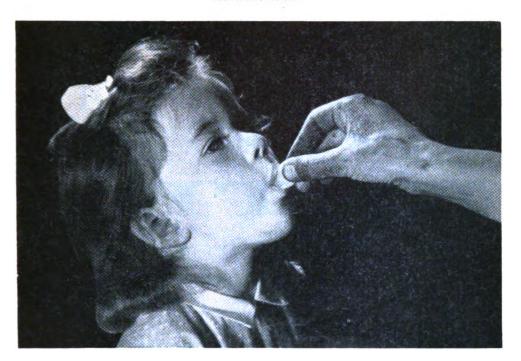
D.I.H.

Lieutenant-Colonel T. W. CARRICK, O.B.E., M.B., D.P.H.

D.O. Captain P. V. PIGOTT, M.B.

Lieutenant W. H. G. DOUGLAS, M.B.

D.T.M. & H. Captains. R. S. BRITTON, M.B., A. W. BURDON, M.B., J. GRAY, M.B., J. C. GARRETT, M.B., M. L. JOHNSON, M.B., M. G. O. PARRISH, M.R.C.S., P. B. PICKLES, M.B., R. D. C. SOUTHCOTT, M.B., M.R.C.S. and J. L. E. W. THOMAS, M.B., M.R.C.S.; Lieuts. N. A. BOYD, M.B., M.R.C.S., W. G. JOHNSTON, M.B., J. B. KELLY, M.R.C.S., R. MARKS, B.Sc., M.R.C.S., J. H. TAYLOR, M.B., M.R.C.S. and G. W. THOMPSON, B.M.



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BOOK REVIEWS

Clinical Neurology. SIR RUSSELL BRAIN, Bt. London: Oxford University Press. 1960. Pp. 399. Illustrated. 38s.

Sir Russell Brain's writings have contributed much to the advancement of clinical neurology in Britain. His well-known Diseases of the Nervous System is a standard work of reference but has become too large for the general physician. Hence this smaller work which is intended "for those doctors and students who need to know only the essentials of Neurology, but to know them thoroughly." The arrangement is much as in the textbook which makes it very suitable for the student who has examinations to write. The reviewer has naturally looked for items to criticize and has found a few. On p. 41 the indications for operating on cases of Bell's palsy are not adequately discussed. On p. 114 there is some confusion in the description of the E.M.G. changes in motor neurone disease and also in the value of measuring the rate of nerve conduction in cases of the carpal tunnel syndrome. On p. 184 the terms cerebral concussion, contusion and laceration are used for classifying head injuries in a way that cannot be applied in practice. Small vascular lesions of the brain in infancy (abortive infantile hemiplegia) often cause focal epilepsy which begins at the age of 13 or 14 years, long after the causative illness. This is a fact of practical importance which would be worth including in later editions. The book is well produced and is easy to read.

W. RITCHIE RUSSELL

Behaviour Therapy and the Neuroses. Edited by H. J. EYSENCK. Oxford: Pergamon Press. 1960. Pp. 480. 63s.

This is a collection of papers by authors who use modern learning theory as the basis of therapeutic and experimental work in the neurotic disorders. Professor Eysenck has long tilted at the Freudian windmill and has more seriously questioned the efficiency of psychotherapy in neurosis. More constructively he postulates an alternative theory of neurosis and recommends other treatment grouped under the term Behaviour Therapy. The theory is that all neurotic symptoms are merely learned patterns of behaviour which for some reason or other are unadaptive. Therapy consists in the unlearning of these unadaptive patterns by methods based on "reciprocal inhibition," "conditioned inhibition," "aversion" treatment and "positive conditioning." The work on reciprocal inhibition by the South African psychiatrist, Wolpe, the papers on aversion treatment of fetishism and homosexual behaviour and the use of speech shadowing techniques in stammering are all especially interesting. Psychiatrists and psychologists alike will find here many stimulating ideas.

J. F. D. MURPHY

Twice a Victim. LYNDA H. CAVEN. London: Faber and Faber. 1959. Pp. 220. 18s.

The author of this clinical autobiography is an active, observant and unashamedly inquisitive woman who has survived a recurrent carcinoma of the mouth and antrum. She successfully overcame the ordeals of major oral surgery, radio-cobalt therapy and dental prosthesis with patience, intelligence and courage. The value of this small book lies mainly in its acute observations on the patient's relationships with her numerous doctors, the small closed worlds of her hospitals, and the desirability of treating the sensible, co-operative patient as a responsible person ready to face the truth, however unpleasant it may appear to be. The patient's refusal to be dominated by illness is a vital factor in recovery and an essential complement to all the doctor's skills.

H. POZNER

Recent Advances in Tropical Medicine. 3rd Edition. SIR NEIL HAMILTON FAIRLEY, K.B.E., F.R.S., M.D., F.R.C.P., D.T.M. and H.; A. W. WOODRUFF, M.D., F.R.C.P., D.T.M. and H. and JOHN WALTERS, M.D., F.R.C.P. London: J. and A. Churchill. 1961. 15 Illustrations. Pp. vii + 480. 15s.

There is scarcely any branch of medical science which, during the last few decades, has advanced as rapidly as tropical medicine. It is a paradox therefore to find that the present edition of this book is but the third of a series which began in 1928 under the authorship of Sir Leonard Rogers, with a second edition in 1929. The authors have taken advantage of the situation and have turned out an entirely new book, rewritten from cover to cover. The choice of authorship is to be commended. Sir Neil Hamilton Fairley, Professor A. W. Woodruff and Dr. John H. Walters have all had a three-fold experience of tropical medicine—as clinicians, as research workers, and as postgraduate teachers. It is precisely this varied experience which makes for excellence in a text book. The authors have interpreted their task with liberality. This work is more than a collection of physical signs and regimes of treatment. It is a thoughtful book intended for the serious student of tropical medicine. The account of the ætiology and epidemiology of trypanosomiasis by Sir Hamilton Fairley is an example of a stimulating and a thought-provoking article. Professor Woodruff has given an excellent survey of anæmia in the tropics, a subject in which he is specially interested. The book covers a very wide range of tropical medicine and the authors have been diligent in picking the best of recent work. The book is thoroughly up to date. The newest information in the hæmoglobinopathies has been fully described and there is an account of Kysanur Forest Disease. The reviewer can find little to criticise adversely. The main fault lies in the inadequate number of illustrations. The medical officer with experience of leptospirosis in Malaya would probably take a much more decided view of the value

of penicillin than that expressed in this book. There is no mention of intestinal biopsy in sprue. The account of scrub typhus will appear sketchy to those who have encountered this disease. This book has been much needed. Every medical officer should possess a copy. The literature has been thoroughly searched, and in no other single publication have the fruits of recent research in tropical medicine been so attractively displayed. It was a happy inspiration of the publishers to ask these authors, who have themselves contributed so much to the advancement of medicine, to write this book. Finally, how refreshing it is to encounter a chapter headed Bacillary Dysentery and not Shigellosis.

R. J. G. MORRISON

Introduction to Dental Anatomy. 3rd Edition. J. H. SCOTT, D.Sc., M.D., L.D.S. and N. B. B. SYMONS, M.Sc., B.D.S. Edinburgh and London: E. & S. Livingstone, Ltd. 1961. Pp. 388. 45s.

The size of this excellent text book has been increased over the original by almost 100 pages, and of these 80 have been added to the section on human dental anatomy. Also the whole of the original text has been revised and new paragraphing and changes in the order of presentation have considerably improved the flow of the material presented. By making the additions referred to above, the authors have achieved their declared, highly commendable aims of seeking to exhibit the structures of the mouth as a logical whole, working harmoniously together, rather than a set of uncorrelated units, and of introducing details regarding recent advances in the field of dental anatomy, including those brought about by the use of the electron microscope. The bibliographies at the end of each section have been reviewed and now contain references to work published up to 1960. Criticism, by reviewers of the second edition, of the quality of the photographs illustrating tooth morphology in Chapter 1 have obviously been noted, for new and greatly improved photographs have been substituted, and 20 new illustrations added at well chosen points. The text is clear and eminently readable, and can be highly recommended to the student as an excellent groundwork on which to build his future studies of dental physiology and pathology, and the clinical dental sciences, and as a book of reference to have by him in later years.

D. V. TAYLOR AND A. M. MILNE

Hospital Infection. Causes and Prevention. R. E. O. WILLIAMS, M.D., M.R.C.P., R. BLOWER, M.D., L. P. GARROD, M.D., F.R.C.P. and R. A. SHOOTER, M. D. London: Lloyd-Luke. 1960. Illustrated. Pp. 307. 35s.

Hospital infection has caused increasing concern in recent years and has become a potent source of anxiety to all members of the medical profession. This book provides an extremely well-written account of the prevalence and mode of spread of different infections, together with recommendations for preventing dissemination within hospitals. Additionally there are special chapters on sterilization, disinfection, and the investigation of outbreaks of infection. Special technical methods used both in bacteriology and in the physical examination of the environment are clearly and simply elaborated. Full and extensive up-to-date references are given at the end of each chapter, and the index is simple, comprehensive and well laid out. This book is a most complete survey of a difficult problem and will be of the utmost value not only to Hospital Infection Officers but also to all who are responsible for the care of patients in hospital.

T. E. Field

Re-Educative Treatment of Suppression Amblyopia. PROFESSOR JEAN SEDAN. Abridged English Edition: T. KEITH LYLE, C.B.E., M.D., M.Ch., M.R.C.P., F.R.C.S., CYNTHIA DOUTHWAITE, D.B.O. and JILL WILKINSON, D.B.O. Edinburgh: E. & S. Livingstone, Ltd. 1960. Illustrated. Pp. 135. 25s.

This book is designed to maintain and improve the vision of an amblyopic eye after the restoration of central fixation. It consists of an explanatory introduction and three parts. Part I contains graduated reading passages starting with large type (N48) and ending with small (N5). Spelling mistakes are scattered about in the script so that careful attention is necessary in reading, and a corrected version follows. Part II contains number exercises and pictures requiring close observation and attention in order to detect deliberate mistakes. Part III contains special exercises, designed by Mr. Charles Thomas, for the treatment of eccentric fixation. Reborn as it is from the very Temple of British Orthoptics, and with such distinguished accoucheurs, this book cannot fail to command the attention it deserves, and should be a great help in, particularly, the home treatment of squinting children.

J. B. George

Medical Helminthology. J. M. WATSON, D.Sc. (Lond.), A.R.C.S. London: Baillière, Tindall & Cox, Ltd. 1960. Pp. 487-xi. Illustrations. 84s.

This is a concise yet comprehensive account of systematic helminthology presented with outstanding clarity. It contains sufficient information to be a valuable work of reference in itself, also providing in its bibliography a guide to more specialized and detailed works. There are 20 tables, all succinct and useful, and 62 pages of excellent diagrams, maps and drawings, which greatly facilitate realistic understanding of helminth morphology, development, life cycles, geographical distribution and so forth. Some of the treatments recommended in the systematic accounts of individual species of intestinal roundworms have become dated by the advent of new drugs, but the book as a whole has been brought up to date by an appendix of recent advances. This book is to be recommended as an authoritative scource of basic knowledge of the subject and as a stimulus to practical study.

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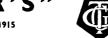
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JOURNAL

OF THE

ROYAL ARMY MEDICAL CORPS



IN THIS ISSUE

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in the Modern Army

Book Reviews

Vol. 107 No. 3 JULY 1961

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IMPORTANT NOTICE

THE Journal is published quarterly in January, April, July and October. The annual subscription is 25s. to include the Army Medical Services Magazine; for the Journal alone £1, in each case payable in advance. A single copy costs 7s. 6d.

All communications will be gladly received by the Honorary Editor, *Journal* of the Royal Army Medical Corps, Royal Army Medical College, Millbank, London, S.W.1. Telephone Number VICtoria 7611.

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Communications about ADVERTISEMENTS should be sent to The Manager, Printing Branch, NAAFI, Kennington, London, S.E.11. Telephone Number RELiance 1200.

The Journal was founded in 1903 to publish among other things: "(1) Original articles written by officers of the Royal Army Medical Corps and others. (2) Bibliographical notes on articles of importance and interest to the military services. (3) Re-prints and translations from military, medical and other journals. (4) Official gazettes and official information generally bearing upon the Army Medical services." This outline has changed little. The Editor is still glad to receive articles, reports, notes, letters, or reviews, from any author, in or outside the R.A.M.C., on professional or personal matters, and he particularly welcomes anything of a non-specialist nature.

All papers intended for publication must be submitted in original type-written copy, double or triple spaced, on one side of good foolscap with generous margins, fully corrected. Any paper not up to these standards may be returned. Authors whose material is based on Service experience are reminded of *Queen's Regulations* (1955), amended July, 1957, para. 680. and are asked to send a copy to the Editor at the same time as writing to PR 1 (a).

There is no set style, but all abbreviations must be avoided. Contributors are on the increase and, with constantly rising costs of production, their papers must be brief. Papers are accepted on the understanding that they are subject to editorial revision, including alterations to condense or clarify the text, and omission of tables or illustrations. Titles must be brief and, if possible, attractive. Lists of References must be on a separate sheet, in alphabetical order, and limited to those mentioned in the text, where they should be in the form "Makewater (1962) observes . . ." or "(Makewater, 1962)." The Harvard system for bibliography is recommended and abbreviations must be according to World Medical Periodicals, 2nd Edition (1957).

The main author of each paper will receive a proof, which should be corrected and returned to the Editor swiftly. The submitted typescript is assumed to be ready for printing without further alteration. Allowance is made for reasonable corrections; unreasonable corrections may be disallowed, or charged to the author. An author who subscribes to the *Journal* is entitled to up to 50 reprints free, divided between the authors of a joint paper.

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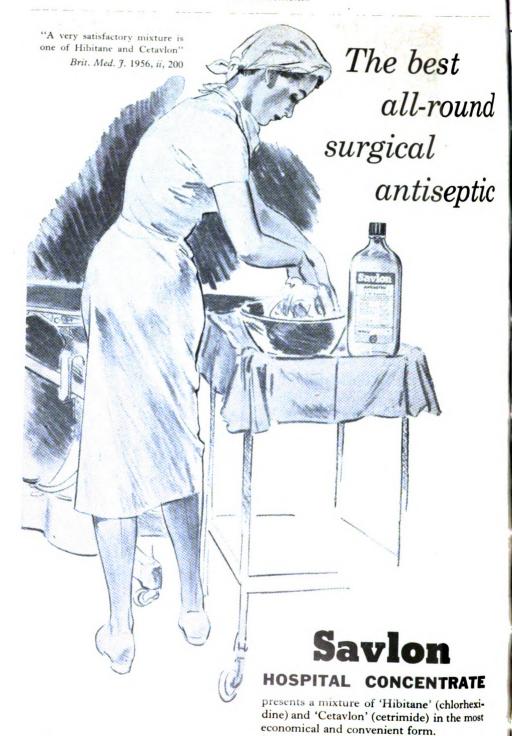
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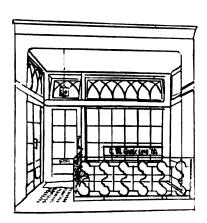
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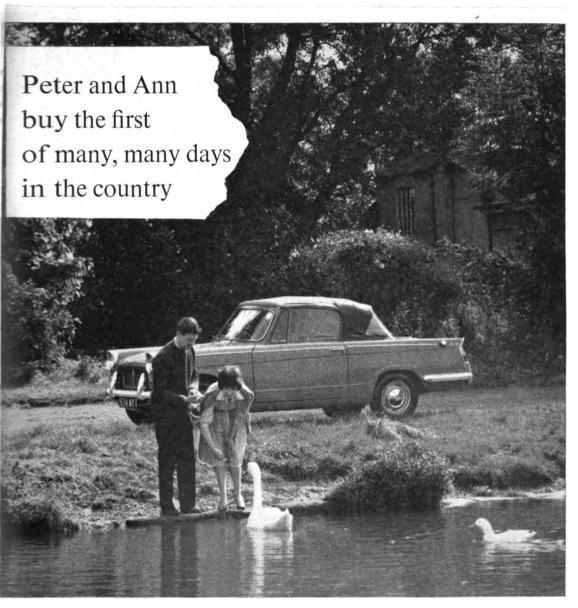
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THE RIGHT APPROACH?

GRATUITIES for medical and dental officers taking Short Service Commissions have been much increased. Those officers presently serving with a Short Service Commission have been given an opportunity to revise their contracts. Judging by the sense of urgency detectable in the recent War Office communication, the shortage which everyone foresaw with the end of National Service is rapidly becoming very real; for Selection Boards are to be set up in overseas Commands and in B.A.O.R. to deal immediately with any applications they may receive. The prominent advertisements in the popular professional journals and in some daily and Sunday newspapers reflect the situation.

Why is the recruitment of medical officers slow? The causes are surely multiple. Captain Starr in his letter in this number points out that before the Second World War the Armed Services offered pensionable employment to medical graduates who were faced with the prospect of purchasing a practice. The National Health Service has removed this attraction. The aftermath of National Service must die away before young doctors come happily to join an institution which had until recently relied on conscription for its numbers. Perhaps propaganda could help here. Which medical student would not be flattered to find that a general was ready to speak with him? If medical schools were visited by an Armed Forces representative, might this not help to banish any exaggerated undergraduate idea of high-ranking officers as necessarily severe and forbidding men? Instead let it be known that they are genuinely interested in the career prospects of their juniors.

128 Editorial

The excellent opportunity to study for addition. I diplomas which the R.A.M.C. affords must stand as a very great attraction. Yet the regard which the remainder of the profession has for us does not merely rest on the number of paper qualifications we possess. Doctors are far too perspicacious, too cynical to be deceived in this way. We surely want to impress medical students and newly fledged doctors with a high standard of medical practice. Do the Armed Services not want to attract those who are keen to devote most of their waking hours to medicine and surgery? Doctors fresh from House Officer appointments still want to do the job they set out to do. Most of them seek employment in which they will find colleagues with a thirst for knowledge equal to their own. They want unselfish instruction. They want to work!

The Army will have to offer more experience. Could the British military hospitals not be opened to the general public? Civilian hospitals up and down the country have enormous waiting lists. If only we could have busy casualty departments with emergencies pouring in!

Young men are restless, ambitious. The method of promotion in the R.A.M.C. gives some degree of security, but it is too rigid. This must continue to deter a large number of able fellows from taking Commissions. Security ought not to be the first consideration with an army officer. The National Health Service allows "Consultant status" to be attained by the early thirties. There is no comparable opportunity in the Army Medical Service. And do we not all thrive on competition? In answer to this plea the usual platitudes are given: when Warrant Officer Miles wrote an able letter which appeared in the last *Journal* the War Office anonymously offered cold comfort: "academic and technical qualifications are not the only requirements for the successful exercise of command at a high level. There are others equally or more important, such as character, integrity, leadership and man management which are developed by experience."

Does the outstandingly capable doctor not possess his fair share of these qualities? Very few would relish the military responsibilities of executive rank. If this is to be a stumbling block to accelerated individual promotion, can it not be dispensed with?

It must be quite obvious that financial inducement will not bring in the most desirable recruits. More money cannot be the whole answer, and indeed this offer must at least be suspect. Upright men cannot be bought. Another approach may have to be tried.

WITH EFFECT FROM TOMORROW

THE future is full of an exciting uncertainty for the Army, and in this the medical services share. Will enough people enlist to deal with whatever problems arise? Or will there be enough problems, preventive or curative, to maintain our medical efficiency? It is a matter of urgent importance that the medical services attract adventurous and talented people, equal to the considerable demands made by a military life. So far so good. Generalizations vague enough to be comfortable, not demanding any action by anyone perhaps below staff rank. But we believe there are several things that many of us could remedy immediately.

Editorial 129

An accepted hazard of life in the Services is posting at short notice. Need this be so very inconveniently short as it often is? Of course in active service or some lesser military emergency there are often factors which serve to transfer our resentment from the military authorities to the politicians or even to the enemy. Again the nature of medical cover for troops overseas, or the high standards of care and specialist services which we now take for granted, both may in many cases justify moves of personnel so rapid as to appear under ordinary circumstances downright inconsiderate. In the many further instances of which we all know where these obvious excuses cannot apply, it is far too easy to fall back on a stock army attitude. The order comes from Command or War Office, it appears to be based on a hasty or belated decision, so, of course, we can blame "them" and shift bad feeling to a level where personal considerations are imagined to be so remote that there is no hope of ever doing away with this type of abuse.

In fact the people responsible for personnel and postings may suffer the same domestic dislocations as any of us and they are well aware that apparently impromptu moves must be avoided wherever possible. They often have to make decisions too quickly because the necessary information has been slow to percolate in from the periphery. We cannot expect the War Office for example to be omniscient if we fail to notify it promptly of arrangements. Commanding Officers must be fully informed of plans. The present position is most unsatisfactory, comparing poorly with that of the rest of the Army, and might well be a bar to recruiting. But the remedy lies with every officer in the Corps and not just with the higher administration.

THE MAGAZINE

THE Army Medical Services Magazine arose of course from the Corps news which used to be given at the back of the Journal. We hope that our readers will remain faithful to the Magazine, which is still the vital supplement to the Journal. Summer Issue (posted with this Journal) contains a further episode of The Third Row, the recollections and reflections of Lieutenant-Colonel R. Lewis (retired), the final part of Lieutenant-Colonel F. J. Grahamsley Slater's "The Water Cart." in which he describes the evacuation of British Forces from Dunkirk during World War II. Mr. J. H. Grundy, Lecturer in Entomology at the Royal Army Medical College, is Important Person No. 52 and the R.A.M.C.'s contributions to the 1961 Aldershot Tattoo and the recruiting exhibition at Selfridges are described. Regular features include Sports News; Association and Old Comrades' News; Editor's IN Tray; Obituaries; and Notes From the Stations. Contributors to this include the Army School of Health, Mytchett; No. 1 Company, Aldershot; the Connaught Hospital and No. 3 Company; Cowglen Military Hospital and No. 13 Company; 20 Company, Tidworth; 28 Field Ambulance, B.A.O.R.; Command Medical Equipment Depot, Cyprus; Far East School of Health, Command Medical Equipment Depot, Singapore; B.M.H. Cameron Highlands and 18 Field Ambulance, Hong Kong. Finally an unidentified correspondent suggests that to boost recruiting the Army should publicize itself better, for present recruiting programmes lack imagination.

SIR ALMROTH WRIGHT

(1861 - 1947)

Sir WILFRED FISH C.B.E., M.D., D.Sc., F.D.S.R.C.S.

Honorary Consultant in Dental Surgery to the Army

To say that Almroth Wright was the man who made the 1914-18 war possible is no doubt an exaggeration and is as provocative as he himself could be upon occasion. But there is no doubt that Wright's work on anti-typhoid inoculation saved hundreds of thousands of lives. It began at Netley in 1893 when Haffkine, the Russian bacteriologist, who had worked with Pasteur, visited the Army Medical College, and it was brought to a brilliant and successful conclusion during the 1914-18 war. Wright was both a clinician and a laboratory worker and he had a simple formula which enabled him to perform this dual role: he did his clinical work in the day-time and spent most of the night in his laboratory. It is true that the constant clinical challenge of diseases for which medicine had as yet no cure, "the pain in the mind" as Colebrook describes it, spurred him on to greater effort, but he loved a fight as much as any man, and the conquest of typhoid in the 1914-18 war was almost as much the result of his determined advocacy as of his unrivalled skill and brilliant scientific imagination in the laboratory. In the course of the controversy he was lost to the Army but found a permanent home, honour, and great opportunities for service at St. Mary's Hospital.

He was one of the last survivors of what the Cavendish Laboratory called the sealing wax and string era that ended for physics in 1914 but persisted in biological research until after the last war. In the '20s and '30s a biological laboratory could be equipped for a few hundred pounds. A microscope of simple design, an incubator, a microtome, a few reagents and some glassware would suffice, but just so much more depended on the inventive genius and originality of the worker himself. And it was here that Almroth Wright excelled. His incredible skill in making and manipulating his minute pipettes and microscopic cells with hands, large and apparently clumsy but in fact sensitive and wonderfully controlled, was only exceeded by the sheer ingenuity of the devices themselves.

It may be true that he who would command must first learn to obey, but Almroth Wright is a notable example of the fallacy that he who would lead must first learn to follow. He had a wonderful flair for inspiring loyalty and enthusiasm in his staff but he was himself only happy when he was the leader. He was well aware of the responsibilities of leadership. At St. Mary's he gathered his own team around him, founded his clinic and then, since he had only two rooms to accommodate the six or seven virtually unpaid workers, several visiting scientists, and the rapidly growing clinic, he collected the money to rent some empty wards from the hospital and fit them out as laboratories. There he continued to inspire his team to seek new means of securing specific immunity to bacterial disease. During the first war the resources of the departmental staff were devoted to making anti-typhoid vaccine and after the war this became a means of financing their research work. The research output is known

to everyone: the discovery by Wright and Douglas of the opsonic index and its use in controlling the dosage of vaccines, Freeman's work on the desensitization of hay fever patients with extracts of grass pollen, Wright and Fleming's work on wound infection in Boulogne at 13 General Hospital where other members of the Inoculation Department soon joined them, Colebrook's work with Fry and Hare on puerperal sepsis culminating in the use of the sulphanilamides for the infection, and, of course, Fleming's discovery of lysozyme in 1922 and of penicillin in 1928. More recently still the production of virus vaccine against influenza has been developed.

How then can one reconcile the role of an original thinker reflecting on the abstract problems of research with that of a man of action, collecting funds to build a research institute and forcing political issues at the highest levels? In fact there is no real conflict. The disciplines of research are just as strict and the objective must be pursued with the same brand of indomitable determination as must the purpose of any political or business engagement. The same courage is needed, the same qualities of leadership and the same stamina. Almroth Wright had them all. He was a man of exceptional insight and quick understanding. He could concentrate for long periods on an elusive sequence of ideas, but always with a constructive purpose. All his scientific speculation, supported by superb technical skill and by great ingenuity, had a practical trend which earned for him a place among the greatest benefactors of mankind whilst he was still in the prime of life.

Sir ZACHARY COPE B.A., M.D., M.S., F.R.C.S.

Consulting Surgeon to St. Mary's Hospital, Paddington

Almroth Edward Wright was one of the most notable figures, perhaps the most notable figure, in the medico-scientific world during the first two decades of this century. He had a double connection with the Royal Army Medical Corps. From 1892 to 1902 he was professor of Pathology at the Army Medical School at Netley; and during the course of the First World War he served in France with the rank of Colonel, doing important research work on the bacteriology of wounds. Almroth Wright was the second of five sons of the Rev. Charles H. H. Wright, a Hebrew and Arabic scholar who was also a militant Protestant and a powerful controversialist. His mother was the daughter of Professor Nils Almroth, Governor of the Royal Mint in Stockholm; during the Crimean War she had accompanied Lady Alicia Blackwood to Scutari, had met Florence Nightingale and done some nursing. With such parents it was no surprise that four out of five sons attained distinguished positions, nor that Almroth Edward, the most distinguished of the group, had rather an independent and combative disposition, and throughout his professional life maintained a protestant attitude towards what he regarded as the most unscientific methods of the practising clinicians. It is true that at the turn of the century medicine was still in the therapeutic doldrums, but it was on the eve of a great stride forwards in which the discoveries of Wright took a prominent place.

During Almroth Wright's childhood his father held in succession posts in Yorkshire, Dresden, Boulogne, and Belfast, so that it was no wonder that he learnt to speak French and German fluently. At the age of 13 he attended the Belfast Academic Institute where he was well grounded in the classics. At the age of 17 he proceeded to Trinity College Dublin, where he took courses in modern literature and medicine. In 1882 he took his Arts degree, winning the Gold Medal and in the following year he qualified in medicine. Doubtful as to his future he asked Professor Dowden whether he ought to pursue literature or medicine as a career. Dowden advised him to practise medicine and enjoy literature as a pastime.

For the next six years he increased his knowledge in many ways. With a travelling scholarship he was able to visit Leipzig and learn from Cohnheim, Weigert and Ludwig. A year later he gained a law studentship and for a year studied law. Then apparently still undecided as to his future career he entered the Higher Civil Service and was posted to the Admiralty; he occupied his spare time in working at the Brown Institute where he met Victor Horsley and L. C. Wooldridge. He soon tired of the Civil Service and became demonstrator, first of pathology and then of physiology, at Cambridge University, following this, with the aid of a scholarship of the Grocers' Company, by another visit to scientific centres in Europe. In 1889 he married Jane Georgina Wilson, a Cambridge graduate, and accepted the post of demonstrator of physiology at Sydney University. It was while there and for the benefit of his infant child that he devised the valuable method of citrating milk so as to prevent its clotting in bulk in the stomach. Two years later he returned to England and for a time carried out research work at the laboratory of the two Royal Colleges established under Professor Sims Woodhead. In a period of two years he published eleven papers of scientific worth chiefly dealing with the coagulation of the blood. Then came what he always regarded as a piece of good fortune. He was offered the post of Professor of Pathology at the Army Medical School at Netley. This was the turning point of his life which enabled him to devote a considerable part of his time to research. From now onwards his single aim was to advance medicine by scientific means. For 50 years his life was dedicated to research, chiefly into the problem of therapeutic immunization, and scarcely anything was allowed to stand in its way.

At Netley he had as pupils many brilliant young men who responded well to his enthusiastic stimulation. Himself encouraged by a visit paid to Netley by Haffkine, he began to experiment on ways of producing immunity against infection with the typhoid bacillus. He devised simple methods of measuring the patient's resistance to the bacillus, and experimented on himself and volunteers to show that the injection of killed typhoid organisms produced an increased anti-bacterial power in the blood against the typhoid bacillus. He was thus convinced that protection against typhoid fever could be produced by inoculation with this vaccine, but he had some difficulty in persuading the army authorities to try the vaccine on troops. In the Boer War anti-typhoid inoculation was not compulsory, but its protective power in those who were voluntarily inoculated was demonstrated. Further proofs of its protective power soon accumulated and everyone knows how, by the use of preventive inoculation, typhoid fever in the First World War diminished in incidence and severity with the consequent saving of many lives.

This was perhaps the most spectacular of all Wright's achievements. But this success was not complete for another 15 years. His reputation was now increasing and

from 1898 to 1900 he served on the Indian Plague Commission. Nevertheless, perhaps because of the slow acceptance of his work on typhoid by the Army, Wright was not entirely happy at Netley, and when in 1902 the post of pathologist at St. Mary's Hospital, Paddington, fell vacant and was offered to him, he accepted with alacrity. He now had the chance to develop, under favourable circumstances, the lines of research which he had already begun.

His impact on the hospital and medical school to which he came was remarkable. The writer happened to be a member of the first class which Wright took at St. Mary's. His lectures were enthralling and held the students with such rapt attention that one could have heard a pin drop. His soft melodious voice, his conversational manner carried on without the aid of a single note, his obvious depth of knowledge and keenness to impart it, combined to make him an outstanding and convincing teacher. So convincing indeed that one student who was a doubting Thomas said once that he was not going to a lecture by Wright, for (he complained) "He always convinces me of something which I know to be untrue."

On the research side Wright soon made his influence felt. It was no surprise that many brilliant workers were attracted to work in the laboratories under his guidance. In the early years his closest colleague was Captain S. R. Douglas who had come with him from Netley, but soon many young men joined the devoted band of workers-J. H. Wells, John Freeman, Alexander Fleming, W. Parry Morgan, Leonard Colebrook, John Matthews and many others. These gifted and enthusiastic men worked day and night in the outpatient department and the laboratories, helping Wright to extend the range of vaccine therapy (or therapeutic immunization) to one organism after another—the staphylococcus, the streptococcus, the tubercle bacillus, the influenza bacillus and so forth. Vaccine-therapy soon established itself all over the world. In 1906 this pioneer work of Wright was recognized by his being elected a Fellow of the Royal Society and by the conferment of a knighthood upon him. In 1911 Wright went to South Africa to investigate the outbreak of pneumonia among the native workers in the mines. By inoculation he somewhat reduced the incidence of the disease but it was left to Dr. (later Sir) Spencer Lister to differentiate the types of pneumococcus and to increase the benefit of inoculation. Meanwhile the Inoculation Department at St. Mary's was flourishing and funds for scholarships and research were provided by gifts from generous donors, and also by the sale of vaccines.

In the Great War Wright and his co-workers played an important part in improving the treatment of wounds. His brilliant assistant Alexander Fleming showed conclusively that most of the commonly used antiseptics when applied to wounds did harm to the tissues and even encouraged the growth of septic microbes. Wright showed in addition that stale serum was suitable material in which microbes might flourish, and he recommended that by applying hypertonic salt solution a free flow of fresh serum with anti-bacterial properties should be obtained. This started the treatment of wounds by hypertonic salt solution which was often of benefit and had a vogue for a time. Wright also tried, though without success, to persuade the authorities to appoint a scientific staff who should investigate all the available methods of treating wounds and determine which was the best method which then would be accepted by all serving medical officers.

Up to 1914 Wright had a considerable consulting private practice but he gave this up when he found it interfered with his researches. He was appointed Director of Bacteriology under the Medical Research Council but at the end of the War he returned from France to the laboratories at St. Mary's. He had been honoured with the C.B. in 1915 and at the end of the War he was made a Knight Commander of the British Empire. In 1927 he retired from his chair at St. Mary's but continued as Principal of the Institute of Research which he had built up. The new chemotherapeutic drugs were investigated in his laboratories, and his assistant Leonard Colebrook, working there and at Queen Charlotte's Hospital laboratories, showed the great value of the sulphonamides in the prevention and cure of puerperal fever and other streptococcal infections. When Alexander Fleming discovered penicillin in Wright's laboratories, Wright did not at first take an active part in that line of research. but when at a later date there was some danger that the full credit of the discovery might not be given to Fleming, Wright at once wrote to The Times and called attention to the claims of his colleague. He was rightly proud of the achievements of his junior colleagues, two of whom (Colebrook and Fleming) were elected Fellows of the Royal Society. In the last decade of his life Wright successfully underwent an operation for gall-stones. He died on 30th April, 1947, at his home at Farnham Common. Lady Wright had died in 1926. They had two sons and a daughter.

Almroth Wright was a genius but like many a genius he held some unorthodox views. He did not think highly of mathematics as an intellectual pursuit, and he had a low opinion of statistics as a method of ascertaining the truth of a proposition. He believed the male intellect was in general superior to that of the female, was strongly opposed to giving the vote to women, and justified this in a long letter to The Times (in 1917) and by publishing (in 1913) a book The Unexpurgated Case against Woman Suffrage. He even publicly debated the question with Bernard Shaw. The debate was held at St. Mary's Hospital Medical School and was the most interesting debate I have ever heard. Both protagonists made brilliant speeches and though Wright gained the victory of votes, on the whole honours were easy. Reading Wright's arguments at the present day one can see that many of them have already been falsified. Wright wrote a number of books and took endless trouble so that they should express his thought clearly. Strangely enough by coining many new terms which would express his ideas more clearly he sometimes made it more difficult for the ordinary reader. He justified this by saying "circumlocution is everywhere a temporary, and at all times a difficult, expedient; and the use of mathematical signs as a substitute for speech can be defended only in the case of the inarticulate classes of the learned." This justification was made in his remarkable book The Principles of Microscopy, published in 1906, in which he ingeniously explained the visual phenomena connected with the microscope without calling to his aid either advanced mathematics or complicated physics.

In 1909 he brought out his well-known Studies in Therapeutic Immunization which contained an account of the principal work which had been done in his laboratories during the previous years. In 1906-7 he had published The Principles of Vaccine-Therapy. The technique which Wright used was simple, ingenious, original and full of neat contrivances; in order to make it generally known he and his colleague Leonard

Colebrook published The Technique of the Teat and Capillary Pipette which explained each manœuvre plainly. A second edition was called for in 1921. During the First World War (in 1915) Wright published his views on Wound Infection. In connection with this subject he had a controversy with Sir Watson Cheyne in which Wright dealt some hard blows, some thought too hard.

During the last years of his life Wright thought long and wrote slowly and carefully on the attainment of truth. The book which he was writing was not finished, but the material was edited and published by his grandson. The title was "Alethetropic Logic," the first word being derived from two Greek words meaning "leading to truth." It is not an easy book to read, and it is for the philosophers and logicians to pass judgment on it.

In his new laboratory Wright was a benevolent despot. He was revered and beloved by his colleagues and was known as "The Chief" or "The Prof.", and he loved to joke with and sometimes to tease his friends. Nevertheless everyone knew his was the master mind and it was with him that the decision always lay. Though not a poet himself, he had a great facility for remembering poetry and could quote at great length from Shakespeare, Milton, Dante, and of modern poets, Rudyard Kipling. He once said that he would rather have written Romeo and Juliet than have done all the scientific work he had done. He was very sensitive to great music but he seldom went to concerts. Bernard Shaw meant one of the characters in The Doctor's Dilemma to represent Wright, who went to see the play but came out halfway through.

His predominantly scientific bent made him a little scornful of the clinician's methods. Perhaps if he had had a larger clinical experience before starting his scientific work he might have been a little more lenient. As it was, when he failed to obtain definite experimental proof he sometimes fell back on what he termed "experiential" methods of proof which, in substance, were not so far from the clinician's clinical experience. Many honours were showered upon him, including the Buchanan Medal of the Royal Society, the Fothergillian Medal of the Medical Society of London, and the medal of the Royal Society of Medicine. He was awarded honorary degrees at the Universities of Dublin, Leeds, Paris, Edinburgh, Belfast and Buenos Aires. In 1931 he was made an Honorary Fellow of Trinity College, Dublin, an honour which he very much appreciated. The following year he was made a Fellow of the Royal College of Physicians of Ireland and in 1938 the Royal College of Physicians of London elected him a Fellow.

Sir Almroth Wright will for ever be known as the apostle of vaccine-therapy who extended widely the principle first demonstrated scientifically by that wonderful genius Louis Pasteur. Wright founded and established on a secure foundation an Institute of Pathology and Research which is now known by his name and by that of his celebrated colleague and former pupil Sir Alexander Fleming. On the centenary of his birth it is right that the Royal Army Medical Corps should recall his achievements.

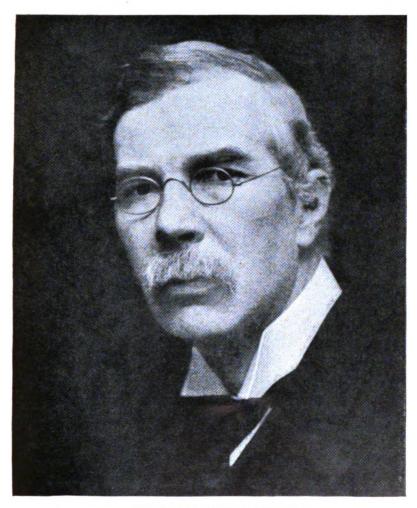
Colonel A. C. H. GRAY O.B.E., M.B., M.R.C.S., late R.A.M.C. retired.

Late Director of Pathology

When I joined the Corps in 1903 typhoid inoculation, that is to say, the injection under the skin of a killed suspension of *B. typhosus*, was well under way. It was initiated and started by Almroth Wright when he was professor of pathology in the Army Medical School, Netley, from 1892 to 1902. The good work was carried on by Leishman, Harvey and others. By the time the war came in 1914 a large proportion of the Army was protected against typhoid fever. If Almroth Wright had never done anything else, this alone would have brought him fame.

I was in charge of a "mobile laboratory" in France in the first war and used to see Sir Almroth at No. 1 Casualty Clearing Station at a place called Chocques on the road to Bethune. He would come into my laboratory and help me with blood cultures in suspected "typhoid" cases. In early 1915 there was still quite a lot of typhoid fever in Belgium and we were both kept busy. So far as I remember, he did not stay in France very long; he soon went back to England to do even more important work.

Whenever I think of Sir Almroth Wright in connection with the Corps, I always at the same time think of Sir David Bruce. I knew Sir Almroth fairly well in those early days, and Sir David very well. Both had a great deal to do with the Corps, and both attained scientific eminence in a high degree. Sir David was the older by some six years, but when one looks into things more closely, the likeness between these two men is not so obvious. Sir Almroth was a wonderful laboratory worker with unrivalled techniques, but I would not like to say the same for Sir David. Lady Bruce did all his laboratory work with great precision, and without her, in my opinion. Sir David would never have reached so exalted a position in the scientific world as he eventually did. Sir Almroth had a great wit and sometimes a caustic tongue, which he knew well how to use, and he had a host of friends, whereas, as far as I could see. Sir David had but few and seemed to me quite devoid of any sense of humour.



SIR ALMROTH WRIGHT K.B.E., C.B., F.R.S.



ARTHUR EDWARD RICHMOND C.B.E., D.P.H.

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Brigadier A. E. RICHMOND C.B.E., D.P.H.

ARTHUR Richmond, who died in January this year, was the last Director of Hygiene at the War Office—and the first Director of Army Health. This translation he himself engineered, as his devotion to the dynamic concept of "positive health" emerged from a professional lifetime of preventive medicine. His splendid personal qualities have been extolled elsewhere 1-4; and there is a danger that these might overshadow the great practical contribution he made towards the organization of the Army's health.

He qualified at St. Thomas' Hospital in 1915 and served for the rest of the First World War and a year beyond in the Middle East and Egypt. In 1921 he obtained the D.P.H., thereafter being posted to India; and in 1923 he obtained the D.T.M. Between the wars he exhibited a catholic taste in his chosen discipline. With McCrombie Young and Brendish he was a member of a commission set up in 1925 to study sandfly fever in Peshawar. Their report⁵, which bears his hall-mark, is a masterly statement of a painstaking and pioneer investigation. In 1930 he carried out "with meticulous care and exactness" applied physiological experiments in a comparative trial of three types of stretcher slings⁶. While Assistant Professor of Hygiene at the Royal Army Medical College, Millbank, an appointment he assumed in 1936, he published a survey of malnutrition⁷ and an exhaustive review of carbonmonoxide poisoning⁸. He also directed the development, over two years, of the Millbank Hot Air Disinfestor and Drying Machine⁹, which was widely used in the field until D.D.T. came into use.

In 1940 he became Deputy Director of Hygiene to the Middle East Forces, where he remained until 1946. Here his great personal charm, his exceptional capacity for inspiring loyalty and enthusiasm, and his quiet confidence born of long and wide experience, assured that everything possible was done to maintain and enhance the health of the Forces. This military achievement involved the acceptance of personal and communal health disciplines by many different allied troops to whom they were sometimes novel ideas. But he and his staff also assumed responsibility for the health supervision of occupied enemy countries and of enormous indigenous labour forces; and at the same time they built up a most efficient industrial hygiene organization to cope with the hazards of a mechanized war. The full scope of these commitments is admirably reviewed by Richmond and Gear¹⁰ and this paper is rewarding reading. In it he is already revealing his delight, above all, in the "positive picture of health and vigour shown by the soldiers. . . ."

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    Lancet (1961). 1, 176-177.
    Brit. med. J. (1961). 1, 216 and 436.
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    Med. Offr. (1961). CV 42.
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    ibid. (1940). 74, 121-137.
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ibid. (1945). 85, 1-32.



In 1945 he was promoted C.B.E. and in 1946 became Director of Hygiene at the War Office. There could not have been a better man in a more useful place at a more suitable time. For now the war drive was over, it could be a period of consolidation or, in less worthy hands, of disintegration. He had the evangelistic attitude and could effortlessly invoke it in others. Clearly he determined where emphasis should be laid by drawing on his compendious experience in the Middle East; but it was also a continuing process stemming from the wide interests he had earlier demonstrated. He gathered together a new generation of hygienists to keep the war lessons alive and used his period of office particularly to equate hygiene with the study of full health—the soldier in his total environment. Much of his work and achievements during this time can be deduced from the Report on the Health of the Army 1946-1948.11 He guided the introduction of the PULHEEMS system of medical classification, a fascinating and monumental task. Again and again he drove home the importance of Personnel Research, with which he was intimately concerned at committee level and by having some control of the activities of physiologists employed on the Medical Research Staff Pool. Through this agency he also pioneered the long and successful post-war nutritional research which effectively defended, and led to improvement in, the soldier's ration scales. He emphasized the complementary importance of physical training and took an especial and stimulating interest in remedial physical training and the functioning of conditioning centres. In October 1947 he brought together these interests in his Chadwick lecture¹² entitled "Positive Health-Its Attainment in the Soldier and the Army's Contribution to it in the Civilian."

Over four years he rationalized health education in the Army, with special reference to the National Service intake. Determinedly he won the necessary time in training programmes covering the whole field from basic training units to R.M.A. Sandhurst and even to troopships. Other highly personal interests were diverse. He sponsored an Inter-Services Advisory Panel on the Purification of Water Supplies in the Field; kept hard at the development of suitable insecticide formulations, and apparatus therefor, at a time when the trade were not yet ready to take a lead; formed a Dermatological Research Unit which he sent to the Far East to study fungal infection. Always his diffident but compelling way of handling people, particularly in committee, was a joy to behold. He played a large part in there birth of the Services Group of the Society of Medical Officers of Health, of which he was President during 1947-48. In 1950 he retired from the Army, was awarded the Chadwick Prize and Gold Medal¹³ for outstanding work in health promotion, and joined the staff of the Ministry of Health as a temporary medical officer.

The real pleasure for a devotee is to discover how quickly he endeared himself to everyone he encountered both at the Ministry and in local government. His stature was in no wise diminished by holding a relatively junior position in an office shared with several colleagues. From 1950 to 1957 he was Secretary of the Medical Research Council Committee on Influenza and other Respiratory Virus Vaccines. High tribute

ibid. (1950) **94,** 272-273.

¹¹ W.O. code No. 6765 (1952).

¹² J. roy. Army med. Cps. (1947). 89, 274-289.

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has been paid to his organization of the Committee's work and, particularly, of the field trials, during the 1957 Asian influenza epidemic¹⁴. He also was keenly interested in the epidemiology of poliomyelitis, which became the subject of a further Chadwick lecture¹⁵ in 1951; and with Bradley¹⁶ he completed a study of metereological conditions in relation to poliomyelitis in England and Wales for 1947 to 1952. A third interest lay in the pattern and control of Sonne dysentery in England and Wales^{17*} ¹⁸; and in many other fields his wisdom became known and was depended upon.

But, having in some measure redressed the balance by this catalogue of activity, one is forced back to the realization that it was by his personality that he exerted most influence; and that he achieved his greatest successes in the hearts and minds of those who knew him. He had the humility of the truly great—tenacity without aggression, charm without ingratiation, determination without obsession, exactitude without intolerance, dignity without unfriendliness, power without a hint of corruption—above all, kindness and loyalty. Altogether a gentleman.

D.H.D.B.

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14 Brit. med. J. (1958). 1, 161.
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¹⁵ J. roy. Army med. Cps. (1951). 97, 15-33.

¹⁶ Mon. Bull. Minist. Hlth. Lab. Serv. (1953). 12, 2-15.

ibid. (1956). 15, 2-6.

¹⁸ Med. Offr. (1956). 99, 175-181.

EARLY PIONEERS IN TROPICAL MEDICINE

From the Lettsomian Lectures for 1961 given before the Medical Society of London by

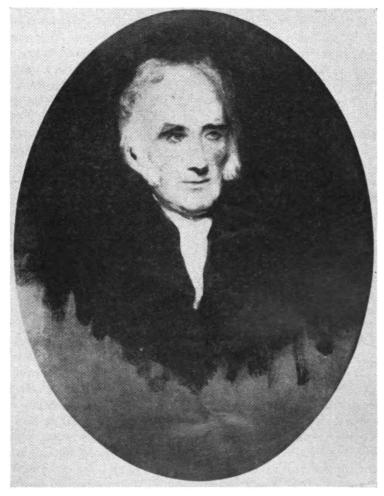
Major-General W. R. M. DREW C.B.E., O.H.P., M.B., F.R.C.P., D.T.M. & H.

Commandant, Royal Army Medical College, Millbank

This lectureship was established in 1850 to commemorate John Coakley Lettsom, our Founder. Altogether 120 Fellows have spoken on a wide range of subjects, but only five on tropical medicine. It is important first to discover how the concept of tropical diseases originated, and then to learn the opinions of distinguished medical men in 1773, when the Medical Society of London was founded.

A small book was published in London in 1598 entitled The cures of the diseased, in remote regions. It is attributed to G. W., now thought to be George Wateson or Whetstone, an Elizabethan poet, soldier and traveller. Singer (1915) believed it to be the earliest work on tropical medicine published in English. It covered diseases like typhus, effects of heat, yellow fever and dysentery. Early medical dictionaries, for example that of Robert James (1743), defined "Tropicus Morbis" as a chronical disease. In his English dictionary Bailey (1721) explained "chronical diseases" as "those as come at certain times by fits, which do not come presently to a height, but the patient lingers, and lives perhaps for many years, afflicted by turns." Forty-two years later this same author published a medical dictionary in which "Tropici Morbi " were defined as " such diseases as those inhabitants are more liable to, who live under the Tropics." Most probably this change of meaning can be explained by the interest in the tropics aroused by the Navy, the Mercantile Marine, the Army and the slave trade in the 18th century. Medical officers in the Services were among the early pioneers to bring tropical diseases to general notice and to report views on their prevention.

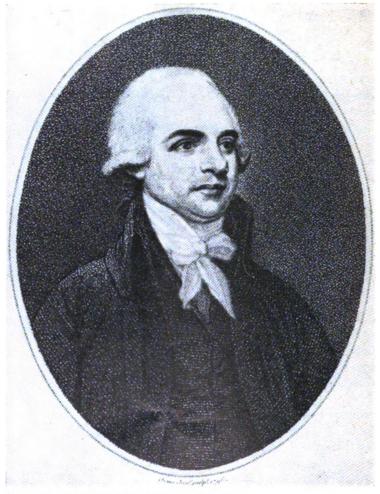
At the end of the 18th century certain British naval doctors were prominent in this respect. Probably the best known was James Lind, who began his naval career in 1739 and gained foreign experience in West Africa, the Mediterranean and the West Indies. Apart from his famous work on scurvy, he wrote on malarial and gaol fevers. He also invented a barrel for purifying water by sand filtration and proposed a simple method for the distillation of sea water. It was during his 30 years at the Naval Hospital, Haslar, that he wrote Diseases Incidental to Europeans in Hot Climates, in which he summarized the diseases prevalent in each British possession, and gave definite views on their prevention. Sir Gilbert Blane probably deserves most fame. Helped by William Hunter he became in 1781 Physician to the Fleet in the West Indies, whence he sent various "memorials" to the Admiralty. In the first he showed that on his arrival one in seven seamen died each year from disease, and he advised stricter sanitary discipline. The next year he reported that the health of the British Fleet had improved, mortality being one in twenty, and that no men had died of disease from September 1781 to May 1782, and only 13 were sent to hospital, with smallpox or ulcers. He recognized that personal cleanliness was essential, especially



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SIR GILBERT BLANE, Bt. (1749 - 1834)

Painted by Sir Martin Shee, P.R.A.



[From a print in the Royal College of Physicians of London.]

THOMAS TROTTER (1760 - 1832)

Painted and engraved by D. Orme

because men pressed into the Service were a source of disease in ships. When he found that tobacco was supplied free, whereas soap was an expensive luxury, he ordered a free weekly issue of soap, and suggested that tobacco be bought out of the sailor's own pocket. Apart from improving sick accommodation in ship and on shore, he laid down rules for better feeding, quartering and clothing of the sailor. He expressed views on immunity, noting that the local inhabitants were resistant to disease; he made them perform routine duties on shore, like drawing water and collecting wood, thus preventing crews having to remain long in marshy places. He observed that the peoples of isolated islands kept in good health until strangers, carrying infection, arrived; and he said that "town dwellers by constant exposure to effluvia became resistant, while country people fell victims to disease." His method of water purification with quick lime, which he considered was "rather friendly to the bowels," was soon adopted generally by the Service.

Thomas Trotter joined the Medical Department of the Navy in 1781, and gained his tropical experience in the West Indies slave trade. He had definite views and a prolific pen. He too preached the necessity for personal cleanliness, and stressed the danger of infection from overcrowding and from the presence of convicts and press men. He recommended a strict medical examination before men joined a ship "in order that disorder and infection or foul ulcerous persons may not be admitted." It was probably because he was so familiar with typhus fever and smallpox that he recommended strict isolation for these diseases. In 1800 vaccination was successfully introduced into the Navy, and Trotter presented Jenner with a gold medal, for which he and his fellow officers had subscribed. He related that the washerwomen at Haslar Hospital knew when an epidemic of typhus was occurring from the foul odour of the clothes, and he recommended that things be aired in the cold, after which washing could take place in comparative safety. It is now realized that infected lice soon leave clothing exposed in cold places.

Sir William Burnett, who became Physician-General of the Navy, also helped to introduce valuable reforms. Though he wrote only on bilious remittent fever, his code of instruction for medical officers improved conditions in ships and hospitals. More humane treatment of lunatics was introduced at Haslar, and it was he who recommended that the Naval Hospital, Chatham, be built. He asked for full returns of diseases from each naval medical officer, so that for the first time the health of the Navy could be properly assessed. His work was followed up by Alexander Bryson who later became Medical Statistician at the Admiralty. He soon showed that in the Royal Navy the death rate in West Africa was four times that in the East Indies, and six times that of the Mediterranean stations. It is understandable that as a result, courses of instruction in naval and general hygiene were given to all naval medical officers begining in 1827.

Compared with conditions in the Navy, the Mercantile Marine fared badly. The slave trade was responsible for the spread of disease from continent to continent, but at all costs slaves had to reach their destinations alive. One of the first hand-books for the use of medical men concerned with the slave trade is that of Thomas Aubrey (1729), in which he also mentions the diseases of Europeans on the West African coast. The East India Company ships were another source of tropical experience.



William Hunter's essay on the diseases incidental to Indian seamen or Lascars on long voyages was published in Calcutta in 1804. On the frontispiece he is described as a marine surgeon and a foreign Member of the Medical Society of London. He gives a vivid and painstaking account of two long voyages with full descriptions of the crew, their habits and their illnesses, and instructions to be delivered to commanders proceeding to England with lascar crews.

The circumstances of the soldier were not much better than for his naval counterpart. He was often ill-fed, poorly quartered and unsuitably clothed. It is probably no exaggeration to say that Sir John Pringle did as much as anyone to improve his lot. He became Physician General to the Army and President of the Royal Society. His observations on military diseases published in 1752 was the standard work on the subject for more than 50 years. Though his experience in the field was limited to Flanders his views applied equally to warm climates. Today we can interpret his main descriptions of diseases as malaria, typhus, relapsing fever and plague. He felt strongly that, to prevent its spread, patients with dysentery should be isolated locally in a regimental hospital, and that these diseases could be prevented by enforcing strict discipline in camp. His advice on food, messing, water, billeting and ventilation was sound. It was probably on his recommendation that soldiers were later issued with blankets and an "underwaistcoat" which became known as the cholerabelt. Another 18th century army physician who sought to improve the soldier's lite was Richard Brocklesby (Howell, 1911). He too wrote on the prevention of camp diseases and on improving conditions in the military hospitals, which he said "generated disease and swept men off like a perpetual pestilence." Closely following Pringle and Brocklesby was another army doctor, Donald Monro, who clearly described outbreaks of cholera, smallpox, agues and epidemic catarrhal fever, called influenza. He made a point of comparing the forms of disease observed overseas with those occurring in London. He was later Physician to St. George's Hospital for nearly 30 years. Another discerning observer was Colin Chisholm, who gained his military experience in the West Indies and in the American War of Independence. In his manual of tropical diseases published in 1795 he noted that the indigenous inhabitants had a relative resistance to diseases which were fatal to the newly-arrived Europeans. He also wrote on malignant, pestilential, or yellow fever, which had recently been introduced to the West Indies from the coast of Guinea, by the slave traders. It is surely not without significance in the history of tropical medicine that seven out of ten of these 18th-century pioneers were elected Fellows of the Royal Society.

The Great Epidemic Diseases

Even 100 years ago diseases like typhus and relapsing fevers, cholera, and malaria, were still endemic in Britain. Since that time such an improvement in hygiene and sanitation has taken place that these infections are now confined to warmer regions of the world and are termed tropical. Little interest is taken in them except in time of war. Instead of dealing with tropical diseases I have decided to take a wider view and to discuss certain diseases still prevalent in the tropics, but which occasionally attack those who live in temperate zones. My aim is not to deal with tropical diseases as such, but to throw light on some of the great quarantineable diseases. These are

bubonic plague, louse-borne relapsing fever, louse-borne typhus fever, yellow fever, cholera and smallpox.

In the last century various countries accepted Sanitary Conventions for special purposes. However, it was not until after the Second World War, when the spread of communications made it imperative, that a convention held in 1951 under the ægis of the World Health Organization was able to standardize an international code for the control of the spread of these diseases. All six of them are now internationally notifiable, and, of course, quarantineable. The agreed measures involve the minimal restriction on trade and travel. Since four of these forms of pestilence are spread by arthropod vectors, modern insecticides have sounded the death knell of typhus fever, relapsing fever, yellow fever and plague, and with other improved preventive measures they are readily controllable. Their eventual eradication can be predicted with some confidence.

On the other hand, both cholera and smallpox have for various reasons been more prevalent, especially in Asia. These infections, communicable directly from man to man, present a more difficult problem in times of war, disaster, migration, and pilgrimage, when measures of prevention are so much more difficult to enforce. The pilgrimage to Mecca is a good example of these conditions which favour the spread of pestilence. It was recognized more than 100 years ago that epidemics could be initiated in this way, so that ever since 1858 journeys to Mecca by land and sea have been under strict international control. Today the pilgrims to Mecca travel increasingly by air. In terms of global epidemiology the Moslem Faith, in extent and density, is probably of more importance than any other religion, for it is the duty of every follower of Islam to make the pilgrimage to Mecca once during his lifetime. It is a striking experience to have accompanied more than 1,200 such deck passengers returning by ship down the Persian Gulf to India. Because this ship was delayed many died from starvation, having brought from home just enough rations for the normal duration of the pilgrimage. It is not generally realized that there are 70 million Moslems in Indonesia, 65 million in Pakistan and 70,000 in Albania. In all of these countries followers of Mahomet outnumber any other religious denomination. illustration of pilgrimage in the spread of disease is the Hindu custom of visiting holy places. Their festivals or melas are held yearly along the sacred River Ganges, but are particularly noteworthy every twelfth year in places like Allahabad and Hardwar. It has been estimated that 20 million Hindus make visits of this kind every year, and on these special occasions between one and three million people are concentrated on one part of the river, drinking, bathing, and excreting in the water.

In terms of modern ease of travel we are now close neighbours of countries whose standards of health and hygiene are on a par with the primitive standard of general education of their peoples. Accurate information regarding outbreaks of diseases, therefore, tends to be unreliable. Even before hostilities broke out last year in the Congo, the incidence in Central Africa of some of these major forms of pestilence tended to be higher than elsewhere. Now that control measures have lapsed, dangerous effects have already been felt in many surrounding countries. In Asia and Africa social habits, education levels and economic factors play far larger parts than elsewhere in determining the grouping and distribution of these crowd diseases. Today



their epidemiological control is more urgent and the means to eradicate them more readily available. Since epidemics of cholera and smallpox are of recent occurrence I will consider these two diseases in detail.

(To be continued)

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In July we lose our Assistant Manager, Major Eason, who is retiring after nine years' service with the Journal. He is going to join his family in Cyprus, and we wish him a happy retirement.

REPORT ON NORTHERN NIGERIA

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Officer Commanding

Major C. G. B. DOWNIE M.B., M.R.C.P.(Edin.), R.A.M.C.

Medical Specialist

Major D. D. O'BRIEN M.B., R.A.M.C.

Surgical Specialist
Military Hospital, Kaduna

Work is increasing here all the time, for all our wards have recently been rebuilt and an ever-widening range of medical care is being offered to the families of our Nigerian troops and the Nigeria Police. The infant mortality rate among these families is comparable to that of the United Kingdom in Miss Nightingale's day. Of 1,000 children born in rural areas, where 95 per cent of the population live, 400 do not reach the age of five. For expatriates and their families, health conditions, providing they observe the normal precautions, are extremely good. Young children live in the swimming pool and do particularly well, mothers have adequate help in the home, and there is reasonable schooling up to the age of nine. For families with children at home there are quite good assisted rates out. For instance I have two daughters here, aged ten and six, and my son who is at prep. school, comes out twice a year at Government expense. For a medical officer with a young family, who is both keen on hard work and interested in the problems of Africa, the opportunities are unlimited.

F.G.N.

In the Military Hospital, Kaduna, there are 30 medical beds in one ward, a separate ward of 17 beds for officers, warrant officers, and their families, and an other rank families ward of 14 beds and cots. We hope to double the other rank accommodation in the near future. There are also eight beds for infectious diseases, and four each for tuberculosis and leprosy, usually occupied. The laboratory is equipped to deal with all routine bacteriological, hæmatological, biochemical, and histological demands. There is a direct writing electrocardiograph, and an up-to-date X-ray plant with facilities for screening and tomography has recently been installed.

Sick parades from nearby units are held at the hospital. These sessions resemble a busy G.P.'s surgery in the United Kingdom for more time is spent with families than with troops, but incidence of organic diseases is very high. In the families ward acute respiratory illness forms the largest group. Many pneumonias are seen, often initiated by measles or pertussis. Lung abscess and empyema occur, and respiratory

obstruction from acute laryngotracheo-bronchitis gives worrying problems. Diphtheria and smallpox occur sporadically in the district. Diarrhœa leads to a surprisingly small number of admissions, for it usually responds to outpatient treatment. Meningitis is common and is sometimes otogenic, suppurative ear conditions being another common complication of measles. Amœbic infection occurs at all ages, and an interesting rarity seen recently was amœbic pericarditis in a child of two. Anæmia causes many admissions, for hookworm infestation, hæmoglobinopathies, and irondeficient diets are all common. Children from the remoter areas may be frankly malnourished. Poliomyelitis is rarely seen in the acute stage, but its effects require treatment.

Among the troops respiratory illness is again common and diarrhœa is often severe enough for admission. Intestinal worms and all kinds of filariasis occur. Trachoma and other eye infections are usually treated in out-patients. We see some undiagnosed fevers; at present any non-malarial fever that remains undiagnosed after 72 hours is treated with chloramphenicol, for we have found that otherwise preventable deaths from enteric occur. Infective hepatitis and amœbic hepatitis are often in the wards together. Schistosomiasis is very common in Northern Nigeria and may lead to chronic urinary infections. Hypertension is fairly frequent, and puzzling cardiac lesions present themselves. Peptic ulceration is infrequent, but it does occur. Leprosy and pulmonary tuberculosis are treated both in the ward and in out-patients. There is a moderate amount of venereal disease, but little skin disease even among Europeans. Trypanosomiasis is rare in the centres of population, and malignant disease is uncommon.

There is a very busy General Hospital in Kaduna and extremely friendly liaison exists between the military and civilian practitioners. The members of the consultant staff of University College Hospital, Ibadan always give ready and helpful advice. I have attempted to give impressions rather than an exhaustive survey. There is no doubt that it is possible to gather much more clinical experience in a shorter time than in similar work in the United Kingdom.

C.G.B.D.

Surgery in Kaduna often presents unexpected problems. One recalls a Nigerian child whose face was virtually bitten off by a hyena, and a soldier, undergoing treatment for a fractured femur, being bitten during the night by a snake. One has recently been obliged to kill a snake, when setting out to perform a cæsarean section. The bread and butter surgery differs little from that seen in military hospitals throughout the world. Hernia and hydrocele are particularly common, but appendicitis is rare in the African. Fourteen appendicectomies were performed last year, of which five came from the rapidly dwindling European population. Thyroid adenomata are common in certain regions, with occasional toxic complications. Such cases would not be accepted for military service, but two or three thyroidectomies a year are performed on relatives. Burns are very common and the exposure treatment is particularly suitable here, where weeping surfaces become dry in a matter of hours. Malignant tumours are not infrequent. We recently operated upon a pyloric carcinoma and we have encountered such rarities as perithelioma and Kaposi tumours. There are no specialized units in Northern Nigeria, so one occasionally has to do a hare-lip

repair, a craniotomy for brain abscess, or open reduction of fractured jaws, to give a few examples. Orthopædic cases are few but wide-ranging and include tuberculous joints, talipes equino-varus and dropped foot (poliomyelitis or leprosy being commonly responsible). Trauma causes a surprisingly small number of admissions compared with military hospitals elsewhere, but the occasional fracture requires intramedullary or plate fixation, and tendon injuries are relatively common. Osteomyelitis in its various stages is seen much more frequently than it would be in the United Kingdom.

Uterine and ovarian tumours present frequently. Salpingitis is very common, and infertility (a major disaster in Africa, for it commonly leads to the wife being discarded) presents problems at almost every out-patient clinic. Vaginal repairs and vesico-vaginal fistulæ are occasionally encountered, though not as frequently as they are in civil practice. There are only two beds in the maternity ward at the military hospital, so obstetrics is limited to the wives of officers and senior N.C.Os.

Schistosomiasis presents various genito-urinary problems and I have performed about 250 cystoscopies in this condition. Intestinal worms have been found to cause perforations, obstructions and inflammations resembling Krohn's disease. Onchocercomata are frequently encountered, as are guinea-worms, but there is as yet no surgical treatment of these worms so good as the old method of twisting them on a stick. Research into the cause of tropical pyomyositis has been carried out for the past two and a half years and may yield sufficient information to warrant publication. Sepsis accounted for the majority of the 1,083 operations performed in 1960, and there were many hand infections in stages one rarely sees in the United Kingdom. Resistant strains of staphylococci are also an increasing problem. Our ward and theatre facilities and equipment are now very good, and the variety of our clinical experience compares favourably with that of military hospitals elsewhere. Until the recent appointment of a civilian surgeon the army surgeon acted as honorary consultant to three civilian hospitals in Kaduna. This opened up a vastly fascinating field, such as no consultant would encounter nowadays in the United Kingdom. D.D.O'B.

MILESTONES OF ARMY VENEREOLOGY

Colonel B. LEVY

Adviser in Venereology

ARMED with a formidable battery of safe and effective remedies and supported by modern diagnostic facilities, the venereologist of today must find it very difficult to look back and appreciate the great problems which existed at the beginning of the century. It was not until 1905 that a scientific diagnosis of syphilis could be made. In May of that year the causative organism of syphilis, Spirochæta pallida, was described by Shaudinn and Hoffman. A year later the Wasserman Reaction (W.R.). a serological test for syphilis, came into use. The incidence of venereal disease (V.D.) in the Army during the late nineties and the early part of this century was very high; methods of treatment were largely ineffective, so wastage of man-power was heavy. Up to 1910 the main-stay of treatment was mercury given orally, by inunction or by injection. The occasional side-effects of this drug, stomatitis, debility, and a feeling of sheer misery, were often worse than the disease itself. In 1905 Colonel F. J. Lambkin introduced a treatment of syphilis by intra-muscular injection of mercurial cream over a long period. This superseded treatment by mouth and virtually put an end to invaliding from the Army for syphilis. This preparation became widely known as Lambkin's Cream.

In 1905 a series of reports were published by a Committee convened by the Advisory Board for the Army Medical Services to enquire into the treatment of V.D. and scabies. The Committee was unanimously in favour of the administration of mercury in some form over a period of 18 to 20 months in syphilis, and thought that non-mercurial treatment was unsatisfactory. On the recommendation of the Advisory Board the reports later formed the basis of a textbook of V.D. by General Sir Alfred Keogh, Colonel C. H. Melville, Lieutenant-Colonel Sir William Leishman and Major C. E. Pollock. A later edition published in 1913 included additional matter by Colonel (then Major) L. W. Harrison, who rewrote the chapter on the pathology of syphilis and contributed fresh ones on the treatment of syphilis and gonorrhæa.

In 1909, mainly due to the efforts of Colonel Lambkin, a hospital of one of the Guards regiments was converted for research and instruction in V.D., complementary to the Queen Alexandra Military Hospital and the Royal Army Medical College, Millbank. This Military Hospital in Rochester Row was to be for many years the teaching centre for the Army and an authority for the guidance of civilian as well as army venereology. In that same year Colonel Harrison was posted to Rochester Row to fill the post of pathologist, vacated suddenly due to illness. Until then he had had nothing to do with the management of V.D. in troops and had been working in bacteriology. No W.R. had been done at the hospital and no demonstration of S. pallida by the dark ground method, but before very long both of these diagnostic essentials were in routine use. Long after this a succession of interested and curious

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visitors attended the Rochester Row Hospital to be shown the germ of syphilis. In order to have a source of spirochætes always at hand, Harrison kept the specimens in capillary tubes, a method which later proved useful for sending serum through the post for dark ground examination.

In 1909 Ehrlich and Hata described Salvarsan (606), which was put on the market in December 1910. Harrison had obtained a supply some months earlier, and treatment of syphilis by the organic arsenicals was investigated at the Hospital during 1910 and 1911. Owing to the facilities at Rochester Row for close observation of patients and careful follow-up, the Medical Staff was able to prove the superiority of Salvarsan, and the credit for most, if not all, of the pioneer work in its introduction to England lies with the R.A.M.C. Lieutenant-Colonel T. W. Gibbard was Officer Commanding, Rochester Row, at this period. The new method of treatment was not without danger, and it took time to learn the correct dose and method of administration. The knowledge gained was very profitably used in the Great War, during which 70,000 cases of syphilis were treated. Very early at Rochester Row it was learnt that the use of arsenic alone invited recurrences of syphilis in the form of cranial nerve palsies, so the method advised by Neisser of combining mercury with the arsenic was adopted. The results fully justified this combined treatment.

Research was also directed to the treatment of other venereal diseases. Harrison did not agree to the use of strong astringent fluids for urethral irrigation and advocated a dilute solution of 1 in 8,000 of potassium permanganate for the treatment of gonorrhæa. Time has shown these views to be correct. The aspiration method he adopted for buboes is still the treatment of choice today. Colonel Harrison retired in 1919 and became the adviser in V.D. to the Ministry of Health and Director of the V.D. Department of St. Thomas's Hospital.

During the 1920's the Hospital at Rochester Row closed, and the V.D. Centre was transferred to the Royal Herbert Hospital, Woolwich, where, apart from the war years and a short period (1955-58) at Netley, it has remained since. Undoubtedly the most important advance in the management of syphilis was the great discovery of penicillin which became available to the Army in 1944. At first penicillin was used with arsenic and bismuth, but it was soon realized that the results with the antibiotics alone were just as good; it remains the standard treatment of early syphilis in the Army. The recent development of specific serological tests for syphilis, such as the treponemal immobilization test and the *Treponema pallidum* complement fixation test, has done much to solve the diagnosis of latent and congenital syphilis and the false biological positives sometimes found in nonsyphilitic diseases.

Unlike syphilis, the treatment of gonorrhœa remained static and largely unsatisfactory until the introduction of the sulphonamides in 1937. They gradually became less effective, notably in the 1939-45 war, and the number of relapses increased. In 1941 a special centre equipped with Kettering hypertherms to produce fever was opened at the Royal Victoria Hospital, Netley, under the care of Lieutenant-Colonel A. J. King, R.A.M.C., who had had previous experience with this treatment at the London Hospital. Fever treatment was given to patients suffering from resistant forms of gonorrhœa, Reiter's disease, neuro-syphilis, and interstitial keratitis. The results were often spectacularly successful. The centre was used intensively during

the war years and many regular and temporary officers of the R.A.M.C. and Nursing Service were trained in this highly specialized treatment. It was soon apparent that penicillin was ideally suitable for the treatment of gonorrhæa and it has been standard since its introduction to the Army. Its cure of gonorrhæa brought to notice the prevalence of non-gonococcal urethral conditions which are not influenced by this drug, and the association of urethritis with arthritis and affections of the eye became more apparent.

An intradermal and complement fixation test is available for the diagnosis of lymphogranuloma venereum. This disease, together with chancroid and non-gonococcal urethritis, readily responds to the sulphonamides and various antibiotics. In 1959 metronidazole (Flagyl) was introduced for the treatment of trichomoniasis. It is taken by mouth, and reports of several investigations suggest that an effective systemic treatment has been found.

The relatively low incidence of V.D. and the reduction of the Army after the war led to a great decrease in work, and it was decided in 1954 to stop training new specialists. The appointment of Adviser is maintained and established venereologists are employed in the Far East and in Germany. In other centres the responsibility for diagnosing and treating V.D. rests with the Medical Specialist. To help him in his duties, short courses of instruction, including practical work, have been made available at the Whitechapel Clinic, London Hospital, and at the Special Training Centre, Royal Herbert Hospital. Lectures in V.D. are given to officers attending the courses at the Royal Army Medical College.

Much work has been done and great advances made during the century. In 1897 the incidence of V.D. among British troops in the United Kingdom was 127.5 per 1,000. In 1960 it was only 5.8 per 1,000. It is fitting that this achievement should be recorded as a tribute to the devoted work of many regular and temporary officers who served as advisers and specialists in venereology. This summary must end, however, on a note of caution. In certain overseas stations, particularly the Far East. the incidence of V.D. is still high and is likely to remain so, and it is by no means certain that the position at home will remain satisfactory. It is therefore essential both for the present and to guard against the future, that selected officers be trained and given the necessary experience to cope efficiently with the problems that are certain to arise.

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COMMON SENSE AND MILITARY PSYCHIATRY

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A short time ago a film critic writing in a national Sunday newspaper described psychiatry as "that deservedly unpopular profession." Provocative and unmerited, this statement is symptomatic of one of the more bizarre neuroses of the nuclear age. in which society disparages its psychiatrists whilst attributing to them near-magical powers. This paradoxical attitude is clearly reflected in the Armed Forces, where Service psychiatrists exert an uneasy influence in that disputed and ill-defined territory of human behaviour bordered by Queen's Regulations, military law, personnel administration, orthodox medicine and public opinion. Over the past decade the functions of the Army psychiatrist have overlapped those of priest, welfare officer, special pleader and criminal investigator, and he has become the clinical watchdog and scavenger of military medicine. It is now clear that throughout the Army there is a distressing ignorance of the duties, capabilities and limitations of the Service psychiatrist, and it is necessary to present this specialty in its proper perspective. Psychiatrists, their medical colleagues and their brother officers are equally to blame for the current misconceptions of the place of the psychiatrist in man-management and social welfare. Because of this there has been a tendency for Service medicine to be manipulated in unworthy interests, for common sense to be lost in expediency, and for the psychiatrist to be relegated to the status of Invaliding Officer.

Specialists in most branches of medicine are happily immune from patients or lay advisers who volunteer their own diagnoses. But it is not unusual for a Service doctor to refer a soldier at his own request for psychiatric examination without knowing the reason or ascertaining any evidence of psychological abnormality. There are many non-medical officers who authoritatively diagnose mental disorder in men under their command and insist on psychiatric disposal with or without the co-operation of their unit doctors. The average Service layman's conception of "a mental case" is remarkably adaptable and is moulded by personal prejudices and group customs. It is axiomatic that the degree of suspected mental illness in a soldier is directly related to the amount of administrative inconvenience he is likely to cause his officers. Somewhere in the development of a military technocracy the quality of leadership in certain officers has become adulterated. Although competent in the impersonal mechanics of warfare they frequently reveal themselves to be inept in their handling of human relationships. The centralization of military command tends to restrict the freedom of action of officers in charge of units, and their authority is weakened by the possibility of having to answer to public opinion for their dealings in any but purely military matters with their soldiers. It is not surprising that a commanding officer, faced with a controversial human problem in one of his men, will ignore the dictates of his conscience and training and rapidly transfer his responsibilities to the nearest psychiatrist. The least satisfactory aspect of this situation is that a proportion

of officers who unhesitatingly label their regimental misfits as "mental cases," generally with no justification, are often the most vociferous in private in their criticisms of psychiatry as a suspect form of medicine. When the psychiatrist declines to mislead a medical board by perjuring himself, their powers of rationalization abruptly disappear in their complaints that they have no other way of ridding themselves of their undesirables.

In military hospitals where a commonsense approach to the presumed psychiatric patient is most expected, it is on occasions least apparent. The subtle process of rejection of the soldier, who may be distressed for very good and obvious reasons. begins in Reception where the attending medical officer accepts without question a provisional diagnosis of psychiatric disorder, probably made in an arbitrary fashion by a puzzled or harassed doctor. A cursory physical examination followed by a traditional dose of barbiturate precedes the allocation of the patient to a ward, where he remains in a state of social isolation until he is interviewed by the psychiatrist. During the waiting period it is uncommon to find the medical officer in charge of the ward making any attempt to take a full and careful history from this type of patient or to obtain the relevant medical and regimental documents. When the patient is female, restless, emotionally disturbed or suicidally suspect, ward sisters may become agitated and querulous, forgetting that the basic principles of nursing are applicable to all varieties of illness. The atmosphere of wariness already generated in the hospital is frequently crystalized in an urgent request from the commanding officer for the patient to be either transferred or discharged. No psychiatrist can make a conscientious appraisal of a patient under these conditions. The usual plaint of a hospital commander that he cannot accept responsibility for the welfare of a difficult psychiatric patient because of inadequate facilities is invalidated by the fact that there is never any difficulty in providing special nursing cover for privileged or other seriously ill patients.

The department of psychological medicine in any military hospital could appropriately be called "the Department of Clinical Odds and Ends," since through it pass a succession of medical and surgical patients whose physical complaints and progress do not conform to the comforting pattern of text-book demonstrations. Any patient who questions his diagnosis or who unaccountably fails to improve under the prescribed regime runs the risk of being labelled as a psychosomatic case. This attitude is excusable in newly-qualified doctors with no practical knowledge of the sub-clinical states of ill-health in general practice. It is hardly to be expected of established specialists, who are prone to overlook the most important of all medical axioms that psychological abnormality does not exclude organic disease. Every sentient being reacts emotionally to incapacitating illness, but there is a dangerous tendency in some physicians to lay undue stress on the functional component of some disorder in explaining away an unsatisfactory therapeutic response. Those doctors who repeatedly diagnose primary psychosomatic illness on negative grounds are, as a group, demonstrably aggressive, dogmatic and intellectually inflexible.

Some psychiatrists, when requested to do so, feel it incumbent upon themselves to demonstrate as psychogenic manifestations those symptoms in a patient for which no organic pathology can be found. The tragic fallacy of this line of reasoning is

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clearly revealed in post-mortem records. Persistent vague and isolated symptoms, having no obvious relation to any recognized clinical syndrome, fall into definite groups. They may be simple expressions of the body's protest at constant misuse, or they may be the first warnings of the onset of an insidious disease. They may represent the failure of a person to cope with adverse circumstances, or may equally signify his attempt to come to terms with them. In many instances they are the results of physiological bad habits. A diagnosis of psychosomatic illness ought never to be made unless there is a history of significant emotional stress, evidence of personality defects, and a logical sequence of psychological mechanisms. Conclusions based on ingenious exercises in psychopathology with no reliable premisses provide no proper clues to treatment and are sterile and valueless. The causes of functional illness need not be deep-seated, complex or Freudian in origin, for in a large number of soldiers the ætiology is superficial, imperfectly disguised or frankly and consciously recognized. When symptoms are psychogenic their practical significance can only be assessed in terms of the extent to which they interfere in the patient's life in all its aspects. Headaches, speech impediments, irregular enuretic episodes, and occasional slight disturbances of consciousness provide recurrent complaints, but they rarely seem to interfere with the soldier's social and other non-military activities. In civil life such symptoms would probably be considered too trivial to warrant special medical attention. Jatrogenic disease undoubtedly exists in the Services, and psychiatrists are too often being asked to assume full responsibility for the disposal of soldiers in whom a conviction of chronic invalidism has been instilled by protracted and unco-ordinated investigations of minor symptoms with little initial genuine disability.

Junior psychiatrists, working often for the first time without supervision and in the field, are handicapped in their judgments by insufficient acquaintance with the complex structure of military life. They are seldom aware of the very wide range of behaviour which can be accepted as normal or tolerated in any group. In their first flush of humanitarian enthusiasm, crusading against incomprehension and intolerance, they may regard every patient with a grievance as the victim of an impersonal system. They identify themselves with the individual gallantly resisting dehumanizing and destructive pressures, and forget that they have an obligation equally as important to serve the best interests of the organization. In these days a soldier with a legitimate cause of complaint does not have to invoke the aid of the psychiatrist to get a fair hearing. At the other end of the scale the young psychiatrist who has not learned to evaluate objectively all the available information concerning his patients will be more likely to yield to strong suggestions from senior officers to recommend the invaliding on quasi-psychiatric grounds of personnel for whom they wish to take no further responsibility.

Nowhere is there so much confusion as to the nature of true psychiatric illness as in matters concerning misconduct and discipline. Unit officers have a penchant for describing commonplace misbehaviour in sensational psychological jargon. The opportunist sneak-thief who steals a wallet from the barrack room or breaks open a church offertory box is called a "kleptomaniac." A soldier urinating near a public thoroughfare will be described as an "exhibitionist," and a lonely dullard making naïve overtures of friendship to a child might be frantically condemned as a "sex

maniac." Alcoholic stupors or absent-minded preoccupation are elevated to the status of "blackouts," "amnesia," or even "catatonia." One soldier who, after being roused from a drunken sleep, barked and bit a regimental policeman, was sent urgently to hospital as a case of either "maniacal delusions" or "hydrophobia." Psychiatrists will always examine a soldier for disciplinary purposes, but they object to being told which of the possible diagnoses would be most acceptable to his officers. Any suggestion of raising a protective umbrella over an accused serviceman because he is "normally a good chap," or because he might be financially penalized, or because his regiment or his family might be embarrassed by unpleasant publicity, places the psychiatrist in a false and unfair position. Defending officers and civilian counsel labour under the misapprehension that a service psychiatrist is in some way bound to produce on demand a report helpful to the accused at least in a plea of mitigation. They seldom appreciate that the members of a court martial are usually shrewd enough to draw their own conclusions from their close observation of the prisoner, and that psychiatric testimony of a dubious nature is more likely to count against than for him. No psychiatrist should permit himself to give evidence in court unless he is sincere in his beliefs and statements and has something worthwhile to say. The expert witness voicing matters of personal opinion is particularly vulnerable to ruthless and searching cross-examination, and he may find that his professional reputation is on trial at the same time as an unappreciative and not very deserving suspect. Unwarranted misuse of psychiatrists at trials tends to cheapen their testimony, strains the credibility of courts, and makes it considerably more difficult for the genuinely abnormal offender when specialist representations are made on his behalf.

Reluctant National Servicemen and Regulars with second thoughts are no newcomers to the military scene, but the tactful circumspection with which they appear to be treated in some instances is a slightly perplexing development in the post-war Army, and one in which Service psychiatrists are constantly implicated. The soldier who, after profiting from any material benefits, decides for personal, financial or marital reasons, that he is no longer in sympathy with the Army may report sick, go absent, make himself a nuisance, or simply stay away from his unit with a complaint of chronic unfitness, confirmed to his satisfaction by the regular presentation of uninformative medical certificates. "Nerves" and "suicidal depression" are the medical stock-in-trade of the determined absentee, and it is remarkable how the sudden emergence of acute travel phobias in a hitherto normal individual will render him incapable of returning to duty, but will not prevent him from engaging in profitable casual employment sometimes involving long car or train journeys. The only decisive action that units ever appear to take in the face of such a situation is to refer the matter to the psychiatrist indicating that a quietly arranged invaliding would suit everybody. A short time ago a Depot Commander asked the area psychiatrist to send an ambulance for an unapprehended long-term absentee, whose whereabouts was known, with the intention of admitting him to hospital for psychiatric disposal, not because it was believed that he was ill, but because it was known that he was likely to resist violently any attempt by the authorities to escort him back to his barracks. Aversion to military service, even though it produces frustration and anxiety, cannot

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by itself be equated to an invaliding disorder. The assumption that anyone conceiving a distaste for all forms of military activity is suffering from serious psychological abnormality is as manifestly absurd as its corollary that all well-adjusted soldiers are necessarily stable and free of anti-social idiosyncracies. Self-induced inefficiency, passive resistance to regimentation, and intentional misconduct arising in the volunteer after enlistment are not primarily the concern of the psychiatrist. There seems to be some inconsistency between the official obstructive attitude towards the soldier wishing to purchase his discharge and the readiness to have him boarded out on psychiatric grounds, a much more devious and uneconomical procedure. Indiscriminate recruiting, unimaginative training and faulty management are the main factors in the development of the disenchanted serviceman, and in the problems of his rehabilitation or disposal the psychiatric aspect is usually the least appropriate consideration.

It is widely but mistakenly believed by the lay public that psychiatry advocates the tolerant acceptance of any form of misbehaviour in anyone, because he is assumed to be at the mercy of environmental forces beyond his control. This misconception may account for the unrealistic attitude sometimes adopted towards the disgruntled soldier who stages a suicidal demonstration. Potentially genuine suicidal patients constitute a very small proportion of all those Service personnel who assert dramatically that they prefer death to duty. Nevertheless the mere statement by a soldier that he intends to take his life unless his wishes are complied with is sufficient to dislocate normal administrative routine. It is a curiously pharisaical convention which attaches such importance to the safety of someone inspired by purely selfish motives, and one which is not easily reconciled with the casual disregard of the more dangerous but socially-acceptable suicidal traits in soldiers in peace and war. The unpalatable truth is that the determined and unscrupulous soldier can, by using the suicidal threat, play on the doubts and inexperience of his officers and attain a moral ascendancy in his unit. It is not the unwilling serviceman who represents the most dangerous suicidal risk, but the conscientious N.C.O. or officer who identifies himself with the Army and is reluctant to report sick even though aware of mounting tension and diminished efficiency. Most of the soldiers who make suicidal protests against the Army claim that they do so because of the pressure of their civilian obligations. They ignore the illogicality of their actions, because a successful suicidal attempt would deprive their dependants in a shocking and irrevocable manner of their comfort and support. Experience does not bear out the supposition that the suicidal gesture in a soldier is always indicative of serious emotional disorder. When there has been an ineffectual suicidal incident intended to draw attention to some grievance, retention of the patient in hospital is of little practical value. The main function of the psychiatrist in this case is to return the soldier to his unit as quickly as possible. Suicidal incidents in a military setting can be sporadic and imitative. For this reason a firm and consistent attitude on the part of the commanding officer may avert a crop of similar occurences. The psychiatrist who deals with a succession of pseudo-suicidal patients from any one unit often finds indications of poor morale brought about by inexpert administration and uninspiring leadership.

For reasons which are often clinically obscure the psychiatrist is invited to resolve an administrative deadlock in those personnel problems loosely termed compassionate



and usually falling into three categories. One serviceman feels that the best interests of his parents or wife are served by his premature release from the Army. A second requests a special posting or restricted employment for the benefit of his family, while a third under domestic pressure pleads for a move into or out of married quarters. There are several variations on these themes. A Malayan-born wife has asked for her husband to be permanently posted to Singapore because the English climate rendered her susceptible to colds. Cypriot and Maltese wives have applied for psychiatric reports recommending their remaining behind in the Middle East after the expiry of their husbands' overseas tours. Not all of the possible situations can be dealt with by a rigid application of regulations, although, presumably in the interests of public relations, higher authority seems occasionally to go to farcical lengths to smooth the path of a love-lorn soldier or servicewoman. The official unit attitude to most welfare problems is mainly one of uneasy impatience tempered by some genuine concern. Most units obliged to deal with a social difficulty prefer the easier method of calling on the medical services for help to pressing with determination a case on its own merits. If all other methods fail the psychiatrist is expected to improvise a medical solution permitting everyone to circumvent the regulations and achieve a satisfactory outcome without loss of face. On objective examination very few of the men or their dependants involved in compassionate situations have been found suffering from marked psychiatric illness. Worry, frustration and the displacement of grievances are inevitably associated with the routine stresses of everyday life, and they acquire no specially morbid significance because one of the many possible ætiological factors is a Service environment. Certain aspects of the compassionate problem are worth noting. The administration of the Army Personal Services is neither unfeeling nor hidebound. Almost all the genuinely deserving cases of hardship or distress receive sympathetic and effective attention if they are brought to the notice of a responsible and intelligent senior officer. For the rest, careful investigation has shown that the details of a case presented to a unit are frequently exaggerated or distorted. It is not uncommon to find that the soldier clamouring for his release because of incapacitated or dependent parents had previously shown very little evidence of filial concern, and that his future plans as a civilian would prevent him from assisting his family more effectively than his military duties. The outwardly-devoted husband who claims that his wife's invalidism is due to service life and is affecting his own health and efficiency rarely admits that she is a demanding chronic neurotic who dominates him by her illness, and who would never relinquish the privilege of complaining in whatever circumstances she might find herself. It is asserted by some married servicemen applying for a special disposal that their wives had threatened to leave them if these requests were not granted. The only answer to this is that any woman who is prepared to break up a marriage in this unreasonable manner is probably a bad wife, and that if she did carry out her threat her husband would be more fortunate than he realised. Domestic upheavals and temporary inconvenience must within reason be accepted as the unavoidable occupational risks of a service family. The psychiatrist who unnecessarily converts a welfare problem into a medical one is not only practising bad medicine, but he is doing nothing to help the man and wife elucidate of their own accord the deeper antagonisms which undoubtedly exist

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between them independently of any service stresses. The soldier who sincerely believes that his family and army loyalties are incompatible would do well to change to some other form of permanent employment, but not at the cost of being labelled as a psychiatric invalid. Such deception results only in guilt, and a gradual undermining of his self-esteem and confidence.

One of the more widely known and accepted propositions of psychiatry is that alcoholism is a disease. From a service viewpoint this is a mischievous generalization, since its unqualified acceptance permits the alcoholic to evade the military consequences of his self-indulgence. The aura of spurious good-fellowship surrounding the hardened drinker is part of the service tradition which incomprehensibly associated the ability to remain on one's feet whilst deeply intoxicated with the more obvious soldierly virtues of courage and endurance. The sense-blunting qualities of alcohol were of some advantage when the soldier's life was austere, frequently wretched, and for the most part intellectually sterile. It is now used mainly as a social lubricant, and formalized regimental drinking is officially approved. If in the course of long conditioning a moderate drinker develops into a compulsive alcoholic it is expedient for authority to claim that the fault is in the individual and not in the system. The only fact that really matters is that in a controlled environment a serviceman has been allowed to become an alcoholic. Alcoholism, if it is to be regarded as a disease, should be placed in the same category as malaria, dysentery or venereal infection. These are preventable illnesses caused largely by negligence, and inadequate instruction and supervision. During the war years any commanding officer whose unit showed a high incidence of these conditions was penalized for failing to appreciate his responsibilities. A similar approach to excessive drinking would result in less human wastage and considerably fewer military offences. In the Army there is an emotionally biased tolerance of the alcoholic which causes him to be sent for medical care long after the time when simple unit action could have been effective. The commanding officer who, in an effort to avoid punishing a long-service alcoholic, passes him to the psychiatrist shows an inadequate grasp of the situation, because drunkenness is rarely accepted in law as an excuse for having committed a criminal offence. Most servicemen who drink heavily are not the victims of some abnormal drive. They take alcohol because it is available, they like it, have adopted it as a social habit, and have no intention of remaining abstinent after any threat of disciplinary action has been medically averted. Drying-out procedures and physical rehabilitation in hospital are frequently necessary, but it seems illogical to invalid a chronic alcoholic from the Army and possibly make him eligible for a disability pension because he has almost deliberately rendered himself unfit for duty or responsibility. Military drunkards are often represented as unfortunate individuals who have succumbed to alcohol only after long and creditable service. This picture has very little relation to the truth. Impartial investigation will in most cases disclose that during the most important years of his army life the alcoholic, despite an impressive show of efficiency, has been relatively ineffective, protected by his comrades, and has been drawing his full pay under false pretences. The Army is not a welfare organization, and any suggestion that special medical consideration should be shown to the officer or man who has continually defaulted on his obligations is evidence of peculiarly muddled thinking.

A source of speculation to the army psychiatrist is the officer who states that as long as his men appear to be clean and sober on parade he is not in the least concerned with their drinking habits off duty. He has yet to learn that the consistently heavy drinker never functions clear-headedly or to the best of his ability, that he is erratic, moody, unreliable and a disturbing influence in any position of authority. The treatment of alcoholism is inevitably bound up with discipline, whether externally or internally imposed, and if it is to be of any permanent value the alcoholic must first be faced with the consequences of his over-indulgence after his facade of self-deception has been shattered. Alcoholism in the Services can be prevented by precept and counsels of moderation reinforced by early, firm, and unequivocal management. The ultimate disposal of any soldier, irrespective of rank, who has been incapacitated by habitual excessive drinking is the responsibility not of the psychiatrist but of his unit which has been negligent in its supervision.

The incorporation of women into the structure of the regular Army has created a few recurring personnel problems. The suggestion of abnormal sexual behaviour occurring in a women's unit precipitates a flurry of activity, all eventually directed towards procuring an immediate psychiatric discharge for those suspected of being implicated. Recently from one unit alone representations were made for ten women to be invalided as sexual psychopaths at the same time. There is no justification for the psychiatrist being a party to this sort of panic manœuvre. In general the unit management of such incidents is unsatisfactory. Vague accusations are made against a girl on complaints which are sometimes unreliable and malicious, on hearsay, or on an ambiguous statement extracted from her under pressure. The doctor's report is usually non-committal and uninformative. The girl may be sent to the psychiatrist without first being interviewed by her officer or told why and to whom she is being referred for examination. Unit officers are reluctant to sign any statement making a direct accusation of misbehaviour, and tend to avoid investigating the incident on any but the most superficial terms. It is not realised that even a woman admitting to homosexual indulgence and refusing to exercise restraint under service conditions is more a matter for disciplinary rather than medical action. In civil life she would not necessarily be subject to legal or medical proceedings. Yet a military psychiatrist is expected to attest in a signed report, often on the flimsiest of evidence, that the woman is a pathological pervert or a gross neurotic. From experience he is aware that should an appeal be made by the woman against the manner of her medical discharge her unit officers are quite likely to disclaim any responsibility for initiating the action to dispose of her. There is obviously no place in the Army for promiscuous women with unnatural propensities, but by any standards it is more honest and less confusing to discharge her as an undesirable person than as an invalid.

Certain difficulties in woman-management are peculiar to military hospitals. A trainee nurse who impulsively swallows a few aspirins or sleeping tablets after a quarrel with a boy friend, a stock situation, is immediately sent to the psychiatrist with the comments that she is immature, unstable and unsuitable for ward duties. This formula never varies, but the observations hardly ever agree with those of the original interviewing officer who had noted that the girl was enthusiastic, sensible and capable of making a good nurse. The reports from her immediate officers too often



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show a regrettable lack of percipience and mature judgment. Regardless of his own opinion as to the relative unimportance of such an isolated incident, the psychiatrist is considered unco-operative if he refuses to condemn the girl on sight and jeopardize her future. There is always a suspicion that the nursing officer who is so precipitate in stigmatizing a trainee because of one emotional outburst is projecting a good deal of her own inadequacy. The student who is unlikely to make a good nurse will have given evidence of her shortcomings early on in training, and an application for her discharge should preferably have been based on her obvious lack of vocation and not on some opportune medical triviality.

Military psychiatry is a unique and worthwhile branch of service medicine. When its principles are understood and correctly applied it has something of definite value to offer to the whole field of medical practice in its clinical disciplines, its unparalleled knowledge of the norms of human behaviour, and its experience in the prevention of mental ill-health. Its greatest disadvantage is that the availability of a psychiatrist tends to induce an intellectual paralysis in his colleagues whenever the terms "unstable" or "functional" are loosely applied to a service patient. As a doctor the Army psychiatrist functions best as a member of a specialist team where he is available for consultation during the whole management of any difficult case, and is not regarded simply as the ultimate agent for the disposal of therapeutic failures and diagnostic enigmas. He should always be free to give an impartial opinion, and in disciplinary matters he is under no obligation to "play ball" and automatically dispense recommendations convenient for the purposes of administration. He is neither an arbiter of morals nor a professional advocate for or against the military offender. He tries to interpret the mechanics of adaptation with special reference to a service environment, but he makes no claim to being omniscient or infallible. Perhaps his most important function is to destroy the impression that any person referred to him for investigation is bound to be suffering from mental abnormality, and he must ensure that the individual patient is not unjustifiably deprived of the right of exercising his powers of responsibility or of making decisions. Normality is a conception varying with time and culture. It is not sufficient to judge the behaviour of the modern young soldier by the yardstick of military requirements. He has also to be assessed against the background of a welfare state, a flamboyant and growing cult of group inadequacy, and the naïve conventions of a television society. In the Army the psychiatrist is being increasingly forced to discriminate between fact and fantasy in disease. There is too much irrational use of placebos, there are too many symptoms sustained and aggravated by medical inexperience, and far too many instances where a diagnosis of psychopathy is the last resort of indolence. In relearning the lessons of the past it is possible to combat the wasteful seepage of man-power through psychiatric channels by indoctrinating officers at all levels with the fundamental concepts of personality, volition and responsibility. To achieve this senior psychiatrists with adequate service experience must once again emerge from the hospital sand resuscitate the advisory functions of the psychiatrist at headquarters and in the field. Liaison and first-hand observation are essential to the competent psychiatrist as a serving officer. But as a doctor he must have the intelligent co-operation of all branches in order to give the necessary time and care to the patients who really need his help. With this in mind he

might be advised to try the efficacy of the following litany attributed to the late Sir Robert Hutchison.

From the inability to let well alone; from too much zeal for the new and contempt for what is old; from putting knowledge before wisdom, science before art, cleverness before common sense; from treating patients as cases, and from making the cure of the disease more grievous than the endurance of the same.

Good Lord deliver us.

RUPTURE OF THE ILEUM WHILE SURFING

An Unusual Injury
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An R.A.F. sergeant aged 28, seconded to the Ghana Air Force, was bathing on a beach at Accra in February 1961, about one and a half hours after a moderate meal. He was a novice at surfing, and a big wave tipped him over head first. The head of his surf board hit the sandy bottom, and the base slipped up from his thighs and struck him in the lower abdomen causing severe pain. He walked into the Military Hospital an hour later (about 4 p.m.) still in pain. There was some contusion over the penile urethra and across the lower abdomen, with tenderness and rigidity of the lower abdomen. A few ounces of normal urine were obtained by catheter. By 5.30 p.m. the abdomen was rigid all over and bowel sounds were absent.

Laparotomy with a right lower paramedian incision was done at 6.30 p.m. There was free fluid in the peritoneal cavity and some white flakes of fibrin or digested food, but no obvious blood or fæcal material, nor inflammatory reaction. The appearance was in fact that of a recently perforated peptic ulcer. A tear about 1 inch long was found on the antimesenteric border of the ileum about ten inches from the ileo-cæcal junction. The remainder of the bowel was examined, but no other lesion was found. The tear was sewn up transversely in two layers, the fluid sucked out of the peritoneal cavity and the abdomen closed without drainage.

He was given intravenous fluids and gastric suction for 48 hours and penicillin and streptomycin for five days. He developed a hæmatoma in the right inguinal canal which was absorbed in three weeks, but otherwise his recovery was uneventful.

RADIOLOGY AND THE ARMY MEDICAL SCHOOL

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THE Army Medical School was already 35 years old when Roentgen published his paper "On a new form of radiation" in December 1895, mentioning inter alia the production of shadow photographs of the bones of the hand. The apparatus he used was normal physics research apparatus, available in most laboratories throughout the world, consisting essentially of a Crookes tube and an induction coil. Radiology thus sprang into being fully armed, and within a few days the experiments were repeated and confirmed universally. The new "all-seeing rays" were featured in the popular press, in *Punch* and on the Music Hall stage. The *British Medical Journal* printed articles on radiographs on 18th January, 1896, with a leading article on the same subject on 1st February. Most of the early articles described bony abnormalities and metallic foreign bodies, but included Customs examination of parcels.

The Army Medical School was fairly early in the field. In a latter dated 16th April, 1896, Surgeon Lieutenant-Colonel W. F. Stevenson, M.B., Professor of Military Surgery, applied for a grant of £25 " for the purpose of purchasing the apparatus necessary for photographs by means of Ræntgen X-Rays." He does not appear to have waited patiently for his grant, since the B.M.J. of 25th April contains an article by Mr. Rowlands, an acknowledged authority on this subject, from which the following extracts are taken "At Netley Hospital I attended on the invitation of Surgeon Colonel Stevenson and gave a demonstration of the process, and skiagraphed the case above mentioned" (a case of femoral condyle fracture). "The authorities of the Army Medical Department are taking active steps to introduce the new method into use in the approaching African Expedition (i.e. the Dongola expedition against the Dervishes). The value of the method for the discovery of bullets is undisputed." That Colonel Stevenson's own apparatus did arrive in 1896 is proved by his annual list of operations for this year, in which he states, "the necessary apparatus for skiagraphy has been supplied to the Army Medical School and has given satisfactory results" and describes cases of lodged bullet and bone injury in which the diagnosis "has been rendered easy and certain." His studies of the subject were not parochial, as in August 1897 he attended a Congress in Moscow reporting on five skiagraphs shown by a German military surgeon, noting a little enviously the large coil and tube used. His next list for '97-98 refers to his "powerful coil giving an 18-inch spark. Cossar's Osmium tube and a large German tube." It thus appears the Professor was keeping his apparatus well up to date. In addition to the medical aspect of skiagraphy he also writes penetrating assessments of the difficulties of power supplies in the field and the transportability of apparatus in general. The continued contact of the School with the leaders of radiology is shown by the visit of Mr. Mackenzie Davidson of Charing Cross Hospital to Netley early in 1898 to demonstrate his apparatus and method of localizing foreign bodies. "Mr. Davidson himself localized the bullet in the pelvis of L-Cpl. E. The bullet, near the SI joint, was successfully extracted and the patient later returned to duty." Our Professor, however, not content with second-hand casualties, left for South Africa in October 1899, taking apparatus with him, rather characteristically expending a further £5 18s. 3d. on various items, and left the Assistant Professor to settle the bill as best he could.

Development of field service apparatus was not without outside stimulus and interest, as is shown in the Lancet for May 1898 when a Question in the Commons on 2nd May is reported, asking whether X-ray apparatus has been dispatched to Egypt. The Secretary is able to answer that sets were dispatched on 5th April. At first the new technique was part of ordinary School instruction, but the technical difficulties of keeping the apparatus working soon demanded some degree of specialization. The first special trainee I have traced is in a War Office letter dated 17th November, 1897, "Permission is given by the Under Secretary of State for Surg. Lt. W. E. Huddleston A.M. Staff to proceed from Aldershot to Netley, for instruction in the use of the Ræntgen apparatus, and I am to request that you will be so good as to cause him to be recognized accordingly." Special short courses were thereafter organized and a letter of 3rd October, 1898, submits a list of four officers qualified in the use of the Ræntgen Ray Apparatus. The use of radiography in Field Hospitals of most modern armies was well developed by the end of 1897, being reported from the North-West Frontier of India, the Turko-Greek War and the Spanish-American War. In the taking of Santiago (Cuba) in 1898 the United States Chief of Operating Staff took a civilian specialist in skiagraphy with him, and is enthusiastic about results. Training in the necessary technique was widely available, and the Indian Medical Gazette in December 1899 refers to the X-ray classes available at the new Polytechnic.

After the Boer War the School, now in London and re-named the College, continued its skiagraphic courses under the control of Surgeon-General W. F. Stevenson. C.B., who remarks in the Journal of August 1903, "The figures are reproductions of skiagrams of cases met with in South Africa, and these could be added to in large numbers from the collection in the College." Certificates of competence in skiagraphy had been issued since 1897, but in 1903, the reorganized course for promotion allowed the selection by candidates of special subjects if they so desired. There appears to have been no limit on the number of "specials" one took, some officers securing as many as three. The pass list for January 1904 shows that of 27 candidates, no less than five took the special course of skiagraphy. The attitude to specialization was different, all officers being required to perform a wide scale of general medical, surgical and regimental duties, perhaps typified by the Professor of Military Surgery, who before obtaining this appointment was Assistant Professor of Military Medicine. Further evidence is obtained from the List of June 1905 which shows three "skiagraphists" employed as follows:—one as Company Officer, Gibraltar; another as Bacteriologist and Anæsthetist, Valletta; the third as Adjutant, Manchester Company R.A.M.C. (Volunteers). Lest it be thought this system applied only to skiagraphists. I hasten to add Captain P. Evans, M.B., holding the D.P.H. and special certificates

in Operative Surgery and Specific Fevers, employed as Company Officer, No. 2 Company, Aldershot.

During the period 1902-1914, the College facilities for radiological training appear to have been excellent technical instruction by a technician at the Queen Alexandra Military Hospital and the routine lectures of the general course. Special studies were made at the student's own arrangement at civilian hospitals, though it appears likely that many candidates for "specials" had completed their studies before being called forward for their course. Certainly candidates for operative surgery did courses in Indian civil hospitals and the Universities of Calcutta, Bombay and Madras before coming home. The period of more extreme specialization appears to have started in India in 1909 when the Indian Medical Service opened an X-ray Institute in Dehra Dun, and awarded a specialist qualification in "Electrical Science" after a short but intensive course. Some British Service officers attended this course, presumably with a view to their later promotion examination. In February 1910 D. B. McGrigor, R.A.M.C., attended this course, later being Brigadier and Consultant in Radiology in the '39-45 War.

Up to 1913, technical advances were small keeping the subject readily comprehensible. The invention of the Coolidge (Hot Cathode) Tube in 1913 enormously increased the range and quality of examination, and quickly brought the available information up to a full-time specialty. Owing to war conditions the tube was not much exploited in the United Kingdom until 1916, and its full impact not felt until nearly 1920. During the '14-18 War years the chief military problem was supply of apparatus. The X-ray Section was moved to the Imperial Institute, South Kensington, and toward the end of the war virtually controlled apparatus production in this country. After the war, the Diploma in Radiology of the University of Cambridge was instituted and set a new standard. The R.A.M.C. courses for promotion in 1920 introduced this new concept of specialism and the first qualified British Army Radiologist was the D. B. McGrigor mentioned earler. He was posted to the Queen Alexandra Military Hospital, Millbank, and there conducted and controlled all specialist training in this subject up to 1939. He always insisted that the training was only nominally under the Professor of Surgery, who gave him a free hand.

In 1940, the supply of Radiologists for the Army from civil sources ran out, and a School of Radiology and Radiography was organized within the College, complete with varied X-ray sets, film library and a separate staff. Lacking sufficient patients the students radiographed anything available, including each other, and studied films collected from many other hospitals. The qualification awarded was a "grading" which could be later converted to "specialist" after experience and recommendation. This school produced 60 radiologists and 1,000 radiographers, not counting students from our Dominions and Allies. Experiments in Mass Miniature Radiography were planned and executed from this School, in co-operation with the Ministry of Health. This School continued at a lesser tempo after the war, still in the College buildings until 1950, when it moved to the Royal Herbert Hospital, Woolwich, where it still remains, principally as a school for radiographers.

The role of the College in Radiology since 1948 has been the organization of radiological study at civilian establishments, with a view to the D.M.R.(D.) being

the basic qualification for an Army specialist. This I feel is the proper function of the College in future, that is to say, to ensure that the Army Specialist is in no way inferior in qualification to his civilian counterpart.

It is my pleasure to acknowledge the help given me by Mr. M. Davies, the College Librarian, who supplied a list of references and directed my attention to where further material might be found. Only works available in the College Library were used in this article.

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The following have been elected Fellows of the Royal College of Physicians of London:

Lieutenant-General W. A. BURKI, C.B.E., M.D. (St. Andrews), Director-General Medical Services, Ministry of Health, Labour and Social Welfare, Government of Pakistan.

Major-General C. C. KAPILA, O.B.E., M.B. (Rangoon), Indian Army Medical Corps. Commandant, Armed Forces Medical College, Poona.

Doctor Alan BARHAM CARTER, M.D., D.P.M., M.R.C.P.

PHYSICAL MEDICINE IN THE ARMY

Colonel J. M. CARNOW M.B., F.R.C.S.(Edin.)

Adviser in Physical Medicine

PHYSICAL medicine has emerged as a specialty within recent years, certainly within the Service lifetime of many officers still on the active list of our Corps. It can be said to have been born as an acknowledged specialty in 1931 when it became a new section of the Royal Society of Medicine. It was not, though, till the early days of the last war with the appointment of a Consultant in Physical Medicine to the Army, that it obtained military recognition and its association with the Royal Army Medical College began.

In order that the present scope of the specialty may be better understood it is not out of place and it is certainly interesting to consider briefly its evolution. The parents of Physical Medicine in the Royal Society of Medicine were the old sections of Balneology and Electrotherapeutics. The former was mainly composed of Spa doctors interested particularly in rheumatism and other medical disorders of the locomotor system. The latter included radiologists and other specialists interested in conditions which responded to treatment by physical methods—movements, manipulations, exercises and the use of certain rays. Hospitals had earlier begun to recognise the need for a department which could deal with those cases requiring physical treatment and "re-education." Such departments were put under the titular supervision of a member of the hospital staff, often a radiologist. Other physicians were specially appointed with the sole duty of taking full clinical charge of the department. The London Hospital in 1921 became the first hospital to designate its physician in charge under the title of Physical Medicine. Other hospitals followed slowly and it was not till after the Second World War had begun that the full potentiality of the new specialty was recognized and great expansion followed. In the meantime the new section of Physical Medicine in the Royal Society of Medicine had begun to develop an active interest in the field of Physical Education, the aim of which was the achievement and maintenance of health.

In the Army the pattern of evolution, though similar in some respects, was modified by the special needs and conditions of the Service. The Army had, however, begun to make its own special contribution to the treatment of the sick and wounded and to the field of activity of the physical medicine specialist of the future by the introduction of two special units—the Convalescent Depot and the Physical Development Centre.

We read of medical officers being instructed in the Crimean War that "when the weather was element convalescents would be frequently marched about." It was not till 1909 that the introduction of Convalescent Depots was projected by a War Office committee set up to consider the principles which should, in any future war of magnitude govern evacuation to the United Kingdom. It was proposed that "special disposal depots" should receive those men not requiring hospital treatment. Medical care was to be provided by medical officers normally quartered in the neighbourhood

or by one or more specially appointed to the staff of the depot. The proposal was approved but nothing was effected till about 1911, when 4,750 beds in various barracks in the U.K. were earmarked to provide Convalescent Depots. In the meantime standard plans were drawn up, but it was not till 1914 that a convalescent depot was shown in war establishments and mobilization instructions as a unit of the R.A.M.C. After war broke out Convalescent Depots were introduced at the base, and later in the lines of communication, to relieve congestion in hospitals and to avoid unnecessary evacuation of minor sick and wounded. Their role appears to have been in the main to "harden" those invalids who no longer required active or specific treatment. Convalescence was then "tacitly regarded as a process by which the natural recuperative powers of the body, largely unaided save by the expenditure of time, would of themselves bring about a return to normal, in so far as the normal was capable of attainment." A more imaginative concept of the scope and need for full rehabilitation may be seen in the great chains of orthopædic centres established and inspired by Robert Jones in the 1914-18 War. A wide range of rehabilitation facilities was provided. with remedial exercises, all forms of physiotherapy, and "curative workshops." Between the wars the lead given by Sir Robert Jones was largely forgotten. imperative need to conserve manpower, however, was again forced on the nation in 1939.

In 1936 the rejection rate of recruits labelled as "sub-standard in physique" reached such proportions that it was decided to form an experimental platoon at the Army School of Physical Training. With special feeding and a special course of P.T. and under the supervision of a specialist in Army Hygiene, the results after a course of six weeks were impressive, and the scheme was expanded. A Recruits Physical Development Centre was established in May 1937, and others added after the outbreak of war. Their contribution to the conservation of manpower was significant and they have continued up to the present day.

Physical Medicine during the Second World War

"One of the most interesting as well as one of the most important advances in military medicine arising out of the spirit of the Army Medical Services during this war was the development of an organization specially contrived to undertake the management of the convalescent patient."

In July 1940 the Director-General asked an eminent civilian consultant in Physical Medicine to visit the military convalescent depot at Harrogate, where patients convalesced from injuries or disease of the bones, joints and muscles under the supervision of the orthopædic surgeon. His report clearly indicated the great value of the work done there and advised its extension to all Convalescent Depots and its application as far as possible to the treatment of patients in hospital. It recommended that specialists in physical medicine be appointed to each command to supervise remedial measures in convalescent depots and other medical units, and that instructors specially trained in medical gymnastics and remedial exercises, physiotherapists, occupational therapists and handicraft workers should be made available to such medical units. The recommendations were accepted and a Consultant in Physical Medicine to the Army and later Advisers to Commands were appointed.

The system of rehabilitation, as eventually elaborated, was designed to ensure that

each patient received remedial treatment as early as possible during his recovery, the principle being a sustained drive towards the achievement of maximal functional recovery in the shortest time. Thus the "rehabilitation approach" was instituted in hospital and continued in "convalescent hospitals" and finally in the Convalescent Depot. In the latter the patients required no specific medical or surgical treatment of their original lesion and on arrival were sorted into four grades of fitness for activity. Those in the lower grades required more individual remedial treatments. General activity and training was stepped up through the grades. In some Convalescent Depots a "rehabilitation Wing" was developed to provide for the 10 per cent of the patients found to be in need of more "personal treatment."

The Post-War and Present State of Physical Medicine

After the war our civilian colleagues, except for an Honorary Consultant to the Army, departed. Much of what had proved so valuable during the war went into limbo. Convalescent Depots continued but their establishments and equipment left much to be desired. It became clear that they were not in a position to receive and provide adequate treatment for the more seriously ill or injured patient, at the ideal point in his recovery, i.e. when he had become fit enough to be up and about all day.

The tremendous interest in physical medicine engendered during the war years and given continued effect in civilian practice, and the urgent need for the post-war highly trained Regular Army to conserve its manpower, further underlined the need for the fullest development of the rehabilitation approach in all treatment of disabling conditions. To meet this demand reorganization on the following lines has been carried out in the last four years.

Personnel

Specialists in Physical Medicine. More posts have been written into establishments, facilities for training improved and higher standards of qualification demanded. Training and experience gained in the Queen Alexandra and the Royal Herbert Military Hospitals and in the Army Medical Rehabilitation Unit has been recognised for the purposes of the Diploma in Physical Medicine, by the Conjoint Board in England.

Physiotherapists. The Army School of Physiotherapy, which began as the Army School of Massage soon after the First World War, has been recognized by the Chartered Society of Physiotherapists. Twelve Army-trained physiotherapists now hold the M.C.S.P. and in addition one physiotherapist has gained the Teachers Certificate of the C.S.P. In the near future all students entering the school will be selected and trained for the purposes of the M.C.S.P. examinations only.

Remedial Gymnasts. Army Physical Training instructors who are to work in the A.M.R.U. and in military hospitals, are now given a greatly extended and improved course of training lasting a minimum of one year. Successful completion of the course entitles the instructor to become classified in the new trade of army remedial gymnast, and to take the examination of the Association of Remedial Gymnasts, the recognized civilian body.



The Army Medical Rehabilitation Unit

This unit, set up in 1957, has replaced the pre-existing Convalescent Depots in this country for the latter no longer exist in peace. It is fully equipped and staffed to provide treatment for the seriously ill or injured case at an early stage. The guiding principle is the transference from hospital to the A.M.R.U. of all patients who, when they have become fit to be up and about all day, have remaining a significant degree of permanently reversible disablement. General and specific treatment of the patient by exercises, occupational therapy and recreation proceeds at the A.M.R.U. Where necessary, other specific forms of treatment are provided. Close liaison is maintained with other specialist medical officers, in particular the orthopædic surgeon who makes regular visits. An essential factor is the boost to morale, self-confidence, and self-reliance given by the atmosphere of purposeful activity.

The present scope of Physical Medicine was defined by Frank Howett, the first consultant in physical medicine to the Army, as covering the following fields: management of certain disorders of the locomotor system, restoration to maximum efficiency following disease and disability, and the achievement and maintenance of health.

Though this definition was applied mainly to civilian practice, the work of the Specialist in Physical Medicine in the Army falls fairly clearly into these three fields. Specialists in Physical Medicine are now on the staff of, or visit at regular intervals. all major hospitals in this country. Regular outpatient sessions are held, inpatient treatment is provided in selected hospitals, and the work of physiotherapy departments is supervised. A recent and interesting development has been the provision at certain centres including the A.M.R.U. of electromyographs and other equipment for electro-diagnosis in the neuro-muscular disorders.

It is in the field of rehabilitation, and in particular in the A.M.R.U., that the Army specialist in physical medicine makes his largest, and in some respects his most valuable, contribution to the treatment of the sick or injured soldier. Clearly this field is destined to grow in importance. The Army plans, with the building of a new and specially designed M.R.U., close to, and working closely with, its orthopædic centre, to meet the challenge and match the opportunity.

A specialist in Physical Medicine visits regularly each physical development centre and is medically responsible for recruits on the course. In addition certain training units and depots in each command are similarly visited, and advice given on the medical problems of recruit selection and training.

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[&]quot;St. Bartholomew's Hospital was, of course, founded in 1123 and has been improving gradually ever since."—Mr. Dickson Wright.

HETEROTOPIC PANCREAS CAUSING SYMPTOMS

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PANCREATIC tissue outside its usual location and without continuity or vascularization with the pancreas proper may be called heterotopic pancreas. Klob (1859) made the first histological studies of aberrant pancreas, in the stomach in one case and the jejunum in another. Since then nearly 600 cases have been reported at either autopsy or operation. For a long time the condition was viewed as a pathological curiosity. Recently, however, with increasing use of subtotal gastrectomy for peptic ulcer, heterotopic pancreas has been recognized as a cause of clinical symptoms. Within a year we have seen three cases with heterotopic pancreas in the duodenal wall. In two the aberrant tissue was clearly responsible for the patients' complaints, while in the third there was also a healed duodenal ulcer.

A woman of 49 had indigestion for 33 years, flatulence, and intermittent epigastric and right hypochondriac pain. Recently her attacks had increased in severity and frequency. A barium meal radiological examination showed a persistent fleck of barium at the base of the duodenal cap with no tenderness, an inability to distend the cap, and delayed gastric emptying with pyloric stenosis. With a diagnosis of duodenal ulcer she had a subtotal gastrectomy. Although the surgeon was certain that he had resected the offending area of the duodenum, careful examination of the specimen revealed no ulcer, but heterotopic pancreas was present in the duodenal wall. The patient has had no symptoms since her operation.

A man of 40 had intermittent attacks of vomiting and abdominal pain for six years, and three times he had vomited blood. Recently his attacks had become longer and more severe. A barium meal radiological examination showed a deformed duodenal cap with two questionable ulcer craters in the posterior wall and rather rapid gastric emptying. He had subtotal gastrectomy for duodenal ulcer, but the surgeon could not demonstrate one. Careful examination of the resected specimen revealed no ulcer but heterotopic pancreas in the duodenal wall. The patient's only

complaint since operation has been occasional anorexia in the early morning.

A woman of 45 had bouts of right subcostal pain for 13 years, recently replaced by attacks of vomiting. A barium meal radiological examination in 1956 had shown "old scars of a duodenal ulcer." Two more recent meals showed a small, tender and slightly deformed duodenal cap. Once there was marked delay in gastric emptying but no ulcer was demonstrated. At operation pyloric stenosis with gross scarring of the first part of the duodenum was found. Heterotopic pancreas was present in the duodenal wall.

Discussion

Anatomy. The aberrant tissue occurs in round, firm, finely-lobulated nodules which may be any shade of yellow from tan to cream. These nodules are 1-6 cm. across and often they present a peculiar and diagnostic alteration of the overlying gastric mucosa consisting of a pseudo-diverticulum (Benner, 1951). About 60 per cent of them are in the submucosa of the affected gut (Hudock et al. 1956). Here the pancreatic acini and ducts tend to form tightly-packed, discrete nodules, which raise the mucosa and project into the lumen. Nodules in the muscularis and subserosa are more diffuse and form ill-defined intramural masses. The histological picture may

be that of normal pancreas, but often the islets of Langerhans and even the acini are lacking. The most common sites (Allen et al. 1952) are duodenum (32 per cent), stomach (31 per cent), jejunum (22 per cent), and ileum (9 per cent). It has also occurred in the mesentery, omentum, spleen, transverse colon, gall bladder, extrahepatic bile ducts, liver, mediastinum, a Meckel's diverticulum, and an umbilical fistula. In the duodenum it is usually in a limited area in the second portion, between the major and minor duodenal papillæ. Heterotopic pancreas has been found in 0.6 to 13.7 per cent of routine autopsies, depending upon the diligence with which it has been sought, and in roughly one of every 500 operations in the upper abdominal region at the Mayo Clinic (Barbosa et al. 1946). The incidence is highest in the fourth, fifth and sixth decades of life, and is two or three times more frequent in males than in females.

Radiology. Heterotopic pancreas presents radiologically in the duodenum pylorus, or pre-pyloric region of the stomach as a small nipple-like projection, less than 1.5 cm. in diameter in most cases (Littner & Kirsh 1952). A central dimple or umbilication, representing a mucosal depression at the site of the principal excretory duct of the heterotopic tissue, is unfortunately found in only a few cases, but about 75 per cent show radiological abnormality in the stomach or duodenum, usually a benign polypoid tumour or a filling defect suggesting a peptic ulcer. The latter may be seen even though no ulcer is subsequently found in the excised specimen. When a rounded tumour is observed in the first or second part of the duodenum, it should arouse suspicion of an intramural leiomyoma or a mass of aberrant pancreas. Often however, the most the radiologist can honestly suggest is a polyp or benign tumour.

A survey of the literature on heterotopic pancreas shows three historical phases (Littner & Kirsh, 1952): first the correct embryology was argued, then the serious pathological alterations in these anomalies were described, and the current phase recognizes the entity as a cause of the "duodenal syndrome" or other gastro-intestinal complaints. It seems that aberrant pancreatic tissue may fall heir to all the diseases of the normal organ. Pancreatitis, hæmorrhage, necrosis, cyst formation, benign neoplastic change, malignant degeneration, and hypersecretion of islet cells producing hyperinsulinism, have all been found. Massive gastro-intestinal hæmorrhage from heterotopic pancreas (Hudock et al. 1956) has been reported six times. The presence of aberrant pancreatic tissue in the pyloric region and in the duodenum has produced radiological and clinical findings so strikingly similar to those of peptic ulcer as to lead to subtotal gastrectomy in a number of cases. Not only peptic ulcer, but gastritis, cholecystitis, common bile-duct obstruction, and gastric neoplasm may be clinically simulated by aberrant pancreas. The symptoms are probably related to local alteration in gastro-intestinal motility with muscle spasm due to the presence of the heterotopic mass. Inflammation around the heterotopic tissue or prolapse of the mass through the pylorus may both cause pyloric obstruction.

A recent study of 51 cases collected in the Mayo Clinic in 47 years (Martinez et al. 1958) indicates that patients fall into three groups: those in whom the lesion is clinically significant, those in whom it is coincidental with other significant pathology and those in whom it is merely an incidental finding. Twenty-eight (56 per cent) of the Mayo Clinic cases were clinically significant, seven (14 per cent) coincidental, and

16 (32 per cent) incidental. All of the clinically significant patients had abdominal symptoms which were no different from those of the more common types of gastro-duodenal or cholecystic disease. Sixteen of these people had epigastric or sub-costal pain and the remaining twelve complained of epigastric distress. In two of our cases the heterotopia was clinically significant and in the other coincidental with a healed duodenal ulcer and pyloric stenosis.

In the past most cases have been treated by subtotal gastrectomy, usually with a pre-operative diagnosis of peptic ulcer. Such extensive surgery is of course unnecessary, for the uncomplicated condition is cured by local excision. The challenge lies in making the diagnosis by a closely co-ordinated effort of radiologist, surgeon and pathologist. The X-ray picture often suggests a polypoid benign tumour, ideally a nipple-like deformity in the gastric or duodenal wall. In other cases the findings suggest a peptic ulcer, and the observations of the surgeon are of paramount importance. If he finds a yellowish nodular lesion which he suspects of being heterotopic pancreas he should not hesitate to remove it locally and request frozen section by the pathologist. The patient may thus be spared needless surgery.

Summary

Three cases of heterotopic pancreas are described. In two the heterotopia was responsible for gastro-intestinal symptoms simulating peptic ulcer; in the third there were also a healed duodenal ulcer and pyloric stenosis. The macroscopic and radiological appearances are presented with particular reference to operative diagnosis and treatment.

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Up the Navy!

You know the worthy lieutenant in command of a vessel, who had different medicines numbered 1 to 9 for specific diseases of the crew. When he ran out of No. 9 he mixed together number 6 and 3 and administered.

(In a letter from Florence Nightingale dated 1888).

ROUTINE BLOOD FEEDING FOR INSECTS

Staff Sergeant C. J. OGDEN

In the Entomology Department of the Royal Army Medical College we noticed that the female mosquitoes were not feeding as well as they had been. We found that the rabbits used for feeding the insects were increasingly difficult to handle, probably due to irritation caused by the mosquito bites. Many entomological laboratories use anæsthetized guinea-pigs for feeding the insects, but the guinea-pigs develop an increasing tolerance to the anæsthetic. There is a great deal of literature on feeding arthropods through membranes. A study was made to design an apparatus for the routine feeding of blood-sucking insects in the laboratory. This paper describes the apparatus, its use and the results.

The feeding tank was constructed from $\frac{1}{16}$ -inch perspex. It consists of a six-inch square water bath open at the top, with four circular tubes of $\frac{1}{12}$ -inch internal diameter passing through the tank vertically and extending half an inch beyond the tank above and below. A 100-watt aquarium heater and thermostat pass through one wall of the tank. A lid prevents evaporation and heat loss. A flange fitted all round the tank $\frac{1}{16}$ inch from the base supports the bath on a square of hardboard with a six-inch square hole in its centre.

Two synthetic membranes and two animal membranes were tested with the apparatus, but both synthetic membranes proved unsuitable, for the mosquitoes could not obtain blood through them. The two animal membranes, hog-gut sausage casing and "goldbeater's skin" (prepared ox-cæcum), were obtained packed in damp salt. They were stored at 4°C., and have kept in good condition for a year to date.

The blood used throughout the tests was outdated human transfusion blood in an acid-citrate-dextrose anticoagulant. It was still usable after five months' storage at 4°C., even though a lot of hæmolysis had occurred.

The membrane was cut into three-inch squares and washed in tap water to remove the salt. With the apparatus inverted, a membrane was placed over the end of each tube and held in place by an elastic band. The apparatus was then placed with the hardboard support on the frame of an insect cage. The water-bath was filled to within one inch of the top with warm water and the heater was turned on. When the membranes were completely dry (in about one hour), 25 ml. of blood warmed to 30°C was put into each of the tubes, pouring gently down a glass rod to prevent damaging the membranes. When the blood reached the right temperature the apparatus was put on top of the cage of insects to be fed. The half inch extension of the blood tubes below the base of the tank allowed the membranes to make a good contact with the netting on the top of the cage. The insects were starved for twelve hours before feeding by removing the sugar water from their cage on the previous evening. The apparatus was left for one hour, and the only attention needed was to stir the blood at intervals to prevent sedimentation.

Tests carried out using Aedes albopictus, Culex molestus and Anopheles stephensi showed the best temperature for feeding to be 34°C., confirming Tarshis (1958). Tests at 34°C., to find the best membrane for each species, gave the following results: Aedes albopictus 60.6 and 87.4; Culex molestus, 50.8 and 59.6; Anopheles stephensi, 87.0 and 90.4. The figures represent the percentage of females feeding in one hour on hog-gut and ox-cæcum respectively. Ox-cæcum is definitely the better membrane of the two, but being very thin it is difficult to handle without damaging it. Hog-gut gave slightly poorer results but is the simplest and most economical membrane to use. The possibility of the anti-coagulant affecting the fertility of the mosquitoes was considered, but several cages of each species have now been fed solely on citrated blood for four months without any noticeable loss of fertility or reduction in the viability of their eggs.

I wish to thank Brigadier R. J. G. Morrison and Mr. J. H. Grundy for their encouragement and advice and the Staff of the Department for their help.

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LETTERS TO THE EDITORS

MISS NIGHTINGALE TODAY

From Lieutenant-Colonel D. Hamilton, M.B., M.R.C.P., R.A.M.C.

Sir,

I would not want to spoil Sir Harry Verney's article on Florence Nightingale in your January number by comments of marked pedantry, but it contains a considerable error, first perpetrated, to the best of my knowledge, by Sir Edward Cook and now sustained by Mrs. Woodham-Smith and Miss Nightingale's great-nephew. Florence became a commoner name as Miss Nightingale became a legend, but it was an accepted name before she was born. You have only to read the minor and major novelists (especially the Irish ones) of the late 18th and early 19th centuries; start with Maria Edgeworth's *Ormond*. In Scotland the diminutive form was perhaps commoner, for who rescued Bonny Prince Charlie from Pringle's superiors? Florence was also used as a man's name, but this is of little significance. Anne de Montmorenci was Constable of France, an extremely tough soldier, very much a man, and at least as important a patient of Ambroise Paré's as all those kings.

A biographical error will be repeated in print, in lectures and in casual conversation, and may be used with emotional overtones to blur the truth even further. Reading Mrs. Woodham-Smith's book one feels an emotional approach to the subject with a lack of objectivity and with wrong emphasis. One despairs that this should be the most widely accepted biography of Miss Nightingale, for at the end of it one has little idea what her achievements really were. The striking phenomenon of half a century of apparent neurosis; the way she rounded on her friends and helpers; when they claimed to be too ill to assist her she said that they were not, but that she was ill, though with no time to die; they died and she lived on: this is not treated as an unusual phenomenon or a matter for much interest or comment.

To learn of Miss Nightingale's qualities and clarity of mind it is better to read what she wrote. Read the chapter on Variety in *Notes on Nursing*. We could certainly do with her today, for compared with her writings, what are we to make of modern nurses' occasional comments and misconceptions? Twice-daily recordings of respiratory rate, noted but not counted at the official rate of 18 or 20, might disappear with a host of other nonsenses. What little the modern nurse may know of Miss Nightingale is taught to her by those who may not have read a word Miss Nightingale wrote. The nursing profession created in the Institute of Protestant Deaconesses at Kaiserswerth and the dedication fostered there in Florence Nightingale and Agnes Jones has been turned to pointless discipline by those less intelligent.

No good history of military medicine has been written, not even from the Surgeon-General's library in Washington. We need a work which sets the care of the sick and wounded, with the life and work of the doctors caring for them, in a frame of social and political history, and the history of science, medicine, wars, weapons, diseases, hospitals and organizations, from the Edwin Smith papyrus to the Korean War.

THE CAMBRIDGE MILITARY HOSPITAL, ALDERSHOT, HANTS. 12th March, 1961

I am. etc.,

D. HAMILTON.



CLINICAL PRACTICE IN THE MODERN ARMY

From Lieutenant-Colonel F. G. Neild, M.R.C.S., D.P.H., D.I.H., R.A.M.C.

Sir.

The recent advertisement in *The Times* and the *Lancet* drawing attention to the opportunities for medical practice in the regular Army, particularly for clinical practice and training for higher degrees, was pinned on our library notice board and National Service officers were asked to comment. Their remarks could be summarized under four heads.

- A Not enough money.
- B Although opportunities for clinical practice are excellent out here, there are few in the United Kingdom for a general duty medical officer outside a hospital.
- C Although they enjoyed the work here, they felt that if they stayed too long, they might "miss the bus" in civilian life at home.
- D In the Army there was too much preventive medicine to attract a doctor recently come from a teaching hospital.

On point A—pay differentials—it is not possible to comment out here. The lack of medical officers is just the same on the civil side here. For instance, in the Northern Region, with a population of 18 million people, there are just under 100 civilian doctors—specialists, general duty and general practitioners. The work is there, as explained in a report elsewhere in this issue, but not the doctors. On point D—too much preventive medicine—the great need for a preventive approach to medicine will only be emphasized in the medical schools when the recommendations of the 1944 Goodenough Committee on medical education are fully implemented. There is a pre-service conditioning which will be very hard to counteract until the importance of health in the National Health Service is adequately taught in the medical schools.

On point B I submit that at present opportunities for clinical practice for the general duty medical officer in the regular Army are extremely limited, but that far more could be done, if only establishments were revised. Twelve years ago Brigadier Marriott wrote:

"We need a tradition that the R.M.Os. are the corps d'élite of the younger men. They should be majors. In a regiment a medical officer is on his own for better or worse. If he is good he will tackle his duties with vision and energy, if he is bad he will let things slide and his first idea will be to push off his sick to rear areas. Let the duds be in base hospitals, where there are many seniors to control and coerce them."

In 1960 when two battalions of the Queens Own Nigeria Regiment, each with their own medical officer, were serving in the Southern Cameroons, a bare handful of medical cases were evacuated by road to Enugu (300 miles) and two surgical cases by air to Kaduna (550 miles). The rest were treated on the spot by the R.M.O., with his enlarged regimental medical section including a laboratory technician. This same pattern which is now being seen in the Congo, is not a new development. It was the pattern in Cyprus (Neild, 1958) as it was in the Middle East (Gear, 1947) and the Far East (Marriott, 1949). Since Brigadier Marriott wrote, "The principles of (a) possible almost complete prevention of disease, and (b) early forward treatment,

demand revision of establishments," there has been the enormous development of the light aircraft and helicopter. This resulted, in Cyprus, in the surgical cases being flown direct to the surgeon in the hospital by helicopter, thus overflying the field ambulance on the ground, while the medical ones were treated forward by the R.M.O. If field ambulances are being overflown, then they have lost their original purpose. A revision of establishment becomes possible and a new medical frontier visible. Let, therefore, opportunities for clinical practice now become a reality. Allow the forward medical officer to treat his own cases in peace-time, as he does under wartime conditions and certainly did towards the end of World War II; and give the abler ones status by promoting them majors.

MILITARY HOSPITAL, KADUNA, NIGERIA. 8th April, 1961.

I am, etc.,

F. G. NEILD.

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MEDICAL STANDARDS IN THE MODERN ARMY

From Colonel John Mackay-Dick, O.B.E., M.B., F.R.C.P. (Edin.)

Sir,

Lieutenant-Colonel W. O'Brien in his excellent article in the April Journal on duodenal ulcer in soldiers has stated that, "it is generally recognized that even under the best conditions an ulcer crater can only be demonstrated in 60 per cent of duodenal ulcers." It is because of similar experience that I have always considered that the syndrome would best be designated the periodic dyspepsia syndrome, and that from the point of view of recruiting, as well as the medical disposal of young soldiers, it should be recognized that the periodic dyspepsia syndrome with symptoms, but without radiological confirmation on opaque meal of duodenal ulceration, is merely the early stage of full-blown duodenal ulceration with all its potential complications (Mackay-Dick, 1948). It is understandable that young service personnel with duodenal ulceration should normally be discharged from the Service on medical grounds, while officers and soldiers with long service should normally be retained in the Army, particularly with consideration of appropriate surgical measures, such as resection or gastroenterostomy with vagotomy.

The small compact Regular Army on the cessation of National Service is to number 165,000 at least—some hope 185,000 while others have reasons for assessing our requirements at 200,000 to 220,000 all ranks. What must be emphasized is that everyone of these officers and men must normally be 100 per cent fit to move to any trouble spot in the world at 24 hours' notice. It has been said that for each front-line soldier it needed from four to ten men in the rear to keep him in the front line. The exact number is not important, but what is important is that it has been decided that all members of the Army must be fit to be at the sharp end. Therefore, as all ranks must be fit to serve at least in any tropical, sub-tropical and temperate climates, the necessary physical and mental requirements for such world-wide service must be held by all



ranks. There can be no question of lowering medical fitness standards below those required for world-wide service in order to attract recruits. To suggest doing this would be a retrograde step and would adversely affect the all-round fitness, operational efficiency, morale and prestige of the Army as a fighting force. Surely the hall-mark of the soldier should be his knowledge that every one knows he represents the cream of Britain's young manhood. We shall get these fine young men provided they are treated as such, and one of the first essentials is to get the necessary houses for the married families as quickly as Beaverbrook got the aeroplanes which saved not only the United Kingdom from defeat but the world of free men from darkness.

The PULHEEMS system of medical classification in the British Army has its critics: it has served its purpose and now that we are to have a relatively small and compact regular Army on the cessation of National Service, the PULHEEMS system must be modified. The non-tropical categories, P4 to P6, are really ridiculous, the need for them up till now has been exceptional and they should be put into abeyance. If, as I see it, all jobs for permanently restricted medical categories have been civilianized, it must be clearly understood that normally no one may remain in Category P7 for more than 24 months. At the end of that time anyone who is P7 must either be fit for P1, 2, or 3, or be invalided from the Service. If really 100 per cent fit on enlistment, they would on invaliding be given a "Golden Bowler" or a "Golden Handshake." They must be treated generously. Should anyone invalided subsequently become fit for Category P1, P2 or even P3, then in special cases he could re-apply for further service, and the time he has been in civil life could count for seniority, promotion or pension.

Cases of pulmonary tuberculosis considered today as being acceptable for P2 after medical treatment, either alone or combined with thoracic surgery, should be fit for Category P7 after 12 to 18 months' chemotherapy, and fit for Category P2 after 24 months' chemotherapy in all, if we are realistic and take the advice of our specialists in the field with the result of whose researches the civilian specialists are in complete accord. Every single candidate for enlistment or a commission in the Army should be examined by a team of consultants, and only those 100 per cent fit accepted for service. The regular Army has no time for the chronic dyspeptics or those who suffer from blackouts, migraine, asthma, "nerves" and so on.

We should have psychiatrists in the Army, but all psychiatric cases should be treated in civil hospitals on the staff of which the Army psychiatrists would be consultants. This would relieve many people for duty in general Military Hospitals and in Military Obstetric units.

MILITARY HOSPITAL,
DELHI BARRACKS
TIDWORTH, HANTS.
1st May, 1961.

I am, etc.,
JOHN MACKAY-DICK.

REFERENCE

MACKAY-DICK, J. (1948). J. roy. Army med. Cps., 91, 36-42.



RECRUITING MEDICAL OFFICERS TO THE MODERN ARMY

From Captain D. R. P. Starr, M.B., R.A.M.C.

Sir,

The announcement of the latest pay increases for Army doctors prompts me to voice an opinion. The pay of an unmarried regular lieutenant, 18 months after qualification, is now £785 per annum, from which he has to pay a monthly mess bill of more than £4, leaving a net sum of about £737 p.a. all found. His civilian contemporary will hope to be a Senior House Officer with a salary of £1,050 p.a. If he lives in a hospital, he pays £180 p.a. living expenses, leaving him with £870 p.a. all found. The difference between these figures speaks for itself.

Before the war the R.A.M.C. offered three great incentives to those newly qualified and undecided on their career in medicine. An officer in the R.A.M.C. needed no capital to purchase a practice, and he retired from the Army with a pension. A newly-commissioned lieutenant earned 19/- a day, while his counterpart working as a House Officer earned a nominal sum of perhaps £70 p.a. Some were unpaid. With the National Health Service these advantages no longer exist.

As was only to be expected after the Ministry of Defence's infamous letter to the B.M.A. earlier this year, the doctor conscript gains nothing from the recent increases unless he is a specialist. Far from being an incentive, the small increases for regular R.A.M.C. officers will only discourage the wavering national serviceman from applying for a permanent commission.

Most medical students spend 5½ years in training with no stipend. The Sandhurst cadet is paid from the moment he enters the Army. The sooner the Treasury learns that the doctor has this salary to make up, the better it will be for both the Corps and the whole Army.

MEDICAL CENTRE, INGLIS BARRACKS, MILL HILL, LONDON, N.W.7 18th May, 1961.

I am, etc.,

D. R. P. STARR.

The War Office states: The figure of £1,050 p.a. for a S.H.O. at age 27 or over is correct but superannuation at 6 per cent is deducted from this sum, i.e. £63. This leaves £987 from which must be deducted £180 living expenses—giving a total of £807 p.a. The R.A.M.C. lieutenant receives £785 basic salary with no deductions for superannuation. In addition to his salary he receives an outfit allowance of £157 (tax-free) on being commissioned and maintenance allowance of £36 p.a. thereafter for tax purposes. If he serves for only three years he receives £1,500 tax-free gratuity on termination of his service. If he becomes a Regular he receives £1,500 permanent commission grant on completion of one year's service.

The S.H.O. after a year in the appointment receives £1,100, less 6 per cent superannuation, i.e., £1,034, less £180 living expenses leaving £854. His military counterpart would receive at least £894 and even after deducting £48 for Mess bills has £846. It may also be safely assumed that at age 27 the military medical officer has attained the rank of captain and would be in receipt of £894 p.a. He would, therefore, have a lead over the S.H.O. appointed at 27 years of age. The military medical officer is also granted a basic 42 days' leave p.a. plus three free rail-travel warrants and unlimited concessional rail travel.

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Lieutenant D. J. STRATH, M.R.C.S.

NORTH AND MIDLANDS PHYSICAL MEDICINE CLUB

The seventh annual meeting was held at the Army Medical Rehabilitation Unit. Saighton Camp, Chester on 25th March, 1961, with Lieutenant-Colonel J. B. M. Milne in the chair and Captain D. S. Smith as secretary. The meeting was honoured by a number of distinguished guests, including Dr. Hugh Burt, President of the British Association of Physical Medicine, in his capacity as Civilian Consultant to the Army.

In the morning after the business meeting, Lieutenant-Colonel J. M. Matheson talked on "Some aspects of surgery in the peacetime Army" This was followed by a short introduction to the Unit by Lieutenant-Colonel Milne; the members then adjourned for sherry and lunch. They were taken round the Unit during a shortened version of a normal day's programme, with a short intermission to watch the Grand National on television. This was followed by a lecture by Lieutenant-Colonel R. Fuller on "The Army treatment regime of Reiter's Syndrome." Captain P. Pearson then gave a short analysis of some of last year's results, which was followed by a lively discussion. Finally Captain D. S. Smith demonstrated a number of unusual cases provoking considerable interest and argument.

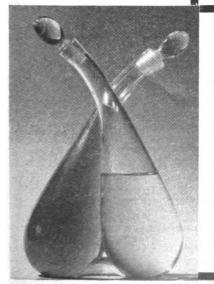
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BOOK REVIEWS

Cysticercosis: An Analysis and Follow-up of 450 cases. H. B. F. DIXON and F. M. LIPSCOMB—Medical Research Council Special Report Series No. 299. London: H.M. Stationery Office. Pp. 58.

Some 30 years ago Colonel W. P. (Later Lieutenant-General Sir William) MacArthur drew attention to the role of cysticercosis as a cause of epilepsy among British troops who served in India. and organized a special investigation at Millbank. Following this, cases were increasingly recognized in this country, mostly among military personnel. Of the 450 cases analysed in this report 98 per cent contracted the disease in India, and since more than 13 years have elapsed since British troops last served there, this publication is almost the end of the story of cysticercosis in the British Army. New cases, however, can be expected to appear in this country from time to time, particularly among immigrants and visitors from Central and Eastern Europe and from Central and South America. where T. solium is still common. This report will undoubtedly be in great demand from many parts of the world and its authors deserve the highest praise. W. H. HARGREAVES

World Directory of Venereal-Disease Treatment Centres at Ports. 2nd Edition. World Health Organiza-

tion 1961. Pp. 164. 8s. 6d. Available from H.M.S.O.

This Directory is designed mainly to publicize Centres at which seamen may obtain treatment for venereal and allied disease. This second edition includes the sixth list, superseding that published in 1959, and contains information received up to 31st July, 1960. It is divided into three main parts: the first contains the text of the Brussels agreement; the second specifies technical definitions and minimum requirements and also includes a revised model of the personal treatment booklet which should be issued to every patient, and the third gives the names and addresses of treatment centres together with the days and times of attendances. This is an excellent publication and should be included in the medical libraries of all sea-going vessels and Special Treatment Centres.

The Early History of Surgery. W. J. BISHOP. London: Robert Hale Ltd. 1960. Pp. 190. Illustrated

This is a remarkable book, for it compresses within its pages an enormous slice of surgical history from prehistoric times to the end of the 19th century and yet remains eminently readable, being in European it will appeal equally to lay or qualified readers, to the novice or to the medical historian. Among the well-known tales, it includes many fresh vignettes culled from the author's encyclopædic knowledge and truly comprehensive reading. It is pleasant to see that the "Piltdown Man" of plastic surgery in the Edwin Smith papyrus is omitted and not given his usual undeserved fame, and also to find Amyand's operation of 1735 given its correct place as the first recorded appendicectomy. "Loving flesh" on p. 39 is presumably a printer's error for "living flesh" and the use of "detract" instead of "distract" on p. 43, although correct, may jar the modern reader, who uses the former word in the sense of belittling. In covering the last two centuries, the logarithmic advance of surgery needs considerable abbreviation and omission to fit in with the linear plan of the book, but the excellent bibliographies at the end of each chapter more than compensate for this. The choice of what to include has been most tastefully made. This book is most highly recommended as a real multum in parvo of the history of surgery, fascinating to read and invaluable for reference. J. C. WATTS

The Hospital Gazetteer 1960. London: British Medical Association. Pp. 162. 5s.

This publication by the B.M.A. is a mine of information for the doctor who is seeking a junior hospital appointment. In concise form it gives details of the number of beds, the types of resident posts and whether they are recognized for professional examinations, and the accommodation and amenities available in all hospitals of Great Britain and Northern Ireland, except mental hospitals. sanitoriums and cottage hospitals. At the end of the book a useful section is devoted to post-graduate education, including a summary relating to higher degrees, diplomas and courses of instruction. D. S. PATON

The Pathology of Tumours, R. A. WILLIS. Third Edition. London: Butterworths, 1960, Pp. 1,002.

This outstanding book has gained great renown since it was first published in 1948 and is now something more than a standard work of reference. Professor Willis deals not only with the gross and microscopic appearance of neoplasms, but also with their histogenesis and natural history. He gives an admirably lucid exposition of available comment and opinion. This edition has been eagerly awaited. All the chapters have been revised and the text amended where recent advances have been made, e.g. the experimental production of tumours, tumours in animals, carcino-sarcoma, the causation, structure and smear diagnosis of bronchial carcinoma, and the smear diagnosis of uterine cancer. Eight hundred references have been added to an already extensive list. The book is beautifully produced, but the binding appears to be inadequate for the weight of the volume.

J. M. ANDERSON

Trends in Juvenile Delinquency, T. C. N. GIBBENS, W.H.O. Public Health Papers No. 5, 1961.

A short chapter draws attention to the pitfalls in the interpretation of statistics, especially when making comparison between generations and even countries. The difference between the individual delinquent and the "social" delinquent is emphasized with two examples of the many attempts to establish meaningful varieties of delinquent conduct and personality. An interesting idea is that youths in many countries are reaching their maximum physical development at an earlier age but are regarded as being psychologically immature to a higher age than formerly. In a further chapter it is suggested that there has been no real change in the behaviour of youth but simply that adults view it with more alarm than they used to. Finally trends in prevention and treatment are well summarized. This is a most excellent report, and it is encouraging to note the increasing collaboration between the various branches of science concerned.

J. McGhie

Air Pollution by Various Authors. World Health Organization. Geneva:1961. Pp. 442. 40s.

There is a tendency among medical men to consider atmospheric pollution mainly for its direct adverse effect on health. This excellent book alters this perspective and deals not only with the viewpoint of the doctor, but also those of the chemist, physicist, engineer, angriculturalist and veterinarian. Nevertheless, although the economic losses caused by air pollution are large (an estimate of £100 million in Great Britain in 1947), it is salutary to learn that in December 1952 London experienced the worst disaster recorded from air pollution, when about 4,000 people died from the effects of smog. What substance in the atmosphere causes ill health is still largely a matter of speculation, but it seems to differ from area to area. The authors favour sulphur dioxide as the primary villain in London. This is open to doubt, but should it be correct, it is disconcerting that the efforts of the Clean Air Act of 1956 are mainly directed towards reducing smoke pollution of the atmosphere and not sulphur dioxide, and that oil-burning appliances emit more sulphur dioxide than do solid fuel devices. With regard to legislation it is heartening that the United Kingdom now has more effective laws to deal with atmospheric pollution than other countries in the world. It is also interesting that although the symptoms experienced by persons exposed to a smog atmosphere are well documented, there is no evidence of impairment from respiratory function tests. It may be that present tests are too crude to detect small changes in respiratory efficiency. The work also contains a very concise account of pollution of air by radioactive substances, important today with increasing use of nuclear energy. This monograph will be very useful to everyone, doctor or scientist, who is interested in atmospheric pollution. J. BARNES

Techniques of Thoracotomy. B. T. LE ROUX. Edinburgh: E. & S. Livingstone Ltd. 1961. Pp. 94. Illustrated 55s.

In his foreword, Sir Clement Price Thomas points out that most text books of operative surgery pay scant attention to the surgery of access. In this monograph Mr. Le Roux describes in detail the standard approaches to intrathoracic lesions, and each chapter conveniently deals with a separate approach. The author has taken great care to describe in detail positioning, draping, incision, drainage, and closure of the chest wall. He demonstrates a neat method of anchoring a drainage tube. The chapter on left and right thoraco-laparotomy is of great interest to surgeons who deal with sub-diaphragmatic lesions not easily accessible from the abdomen alone. The whole text is clear, concise and easy to follow. It is punctuated with excellent illustrations which are complementary to the text. This book has been written primarily for the apprentice thoracic surgeon, but I would recommend it to all general surgeons. The author and publishers are to be congratulated on producing such an excellent contribution to surgical practice.

P. St. G. Anderson

Expert Committee on Addiction-Producing Drugs, Eleventh Report. W.H.O. Technical Report Series, No. 211. 1961. Pp. 16. 1s. 9d.

This reviews the evidence of various countries as to whether certain drugs should be specified as addiction-producing. The work of various international bodies concerned with narcotic drugs is summarized, and there is a note on the medical control of addicts and a list of the drugs under international control. This report is by its nature very specialized, but it is certainly a reminder of the value of international co-operation in such a sphere.

J. McGhie

Anæsthetic Accidents. The Complications of General and Regional Anæsthesia. V. KEATING. Second Edition. London: Lloyd-Luke. 1961. Pp. vii+288. 14 Figs. 28s.

In this new edition Major Keating has enlarged and modernized his book. He describes in detail the cause and effect of every conceivable complication of anæsthesia, and outlines the appropriate methods of prevention and treatment. The great value of this book to the practising anæsthetist is that it deals exclusively with the hazards of anæsthesia, and it is on the skilful avoidance of these pitfalls or their successful negotiation that the safety of the patient and the reputation of the doctor so often depends. It seems a pity that, in so excellent and comprehensive a treatise, such scant reference is made to the real accidents of anæsthesia, such as explosions or faulty maintenance of apparatus. Surely too in these days the medico-legal considerations of anæsthetic accidents should occupy more than two and a half pages.

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Visual Field Defects after Penetrating Missile Wounds of the Brain. HANS-LUKAS TEUBER, WILLIAM S. BATTERSBY and MORRIS B. BENDER. Cambridge, Mass: Harvard University Press. 1960. Pp. 143. Illustrated 38s

Press. 1960, Pp. 143. Illustrated, 38s.

About 20 per cent of patients with penetrating brain wounds have some injury to the visual pathways which causes a permanent defect in the fields of vision. These defects present some highly characteristic features, which are rarely found in non-traumatic disorders, and have been much used to study the anatomy of the optic radiation. This book presents some useful studies of the characteristic field defects after missile wounds and questions the extent to which those changes agree with the generally accepted anatomy of the visual pathways. Many useful observations on congruity and "macular sparing" are recorded. Of special importance is Chapter 7, which is concerned with those higher visual anomalies referred to as fluctuation, extinction, completion, visuospatial agnosia or visual object agnosia. The authors are able to show that visual functions which are not apparently related are affected together, whereas others are readily dissociated, suggesting that certain functions are more vulnerable than others. The results of flicker perimetry and dark adaption tests are also reported. One criticism of this useful work is that the anatomical information provided by the site of wounding might have been presented in more detail.

I. MICHIE

Rehabilitation of Hand Functions. A. N. LEONT'EV and A. V. ZAPOROZHETS. Oxford: Pergamon Press. 1960. Pp. xiii+199. 60s.

It is well recognized that even the most severely injured hands will recover useful function providing that treatment, both in the operative and post-operative stages, is skilful, ingenious, patient, attentive to detail, and set on a purposeful rehabilitation course. This book introduces some new ideas; one of the most important is in investigating the nature of sensory defects and of re-educating sensory function. It also describes some useful practical methods of assessing recovery, and there is an interesting chapter on practical aspects of occupational therapy. Although it is in parts heavy going, the book will repay reading by all who are concerned with the treatment of hand injuries.

Aspects of Public Health Nursing. Various Authors. Public Health Papers No. 4. World Health Organisation, Geneva. 1960. Pp. 185. 8s. 6d.

This interesting book consists of 13 papers on the training and work of nurses in the Public Health field. The American contributors review the deployment of professional and auxiliary nurses in the United States. Their shortage problem seems very similar to our own, and they show the same concern over the status and training of their nursing aides. The description of a scheme of practical training on very much the same lines as our 24 Procedure Training is of practical interest. An American writer also discusses the role of the nurse as a health teacher, and her observations on personal relationships and the skills of interviewing are well worth reading. The British contribution comes from the Secretary of the College of Midwives, who gives the assessment of the work of the domiciliary midwife, and emphasizes the importance of an interchange of midwives in raising the standard of maternal and child care throughout the world. There are accounts of the training and work of Public Health Nurses in California, Brazil, Nigeria, France and the U.S.S.R. The paper from Russia is particularly interesting. An immense amount of work appears to be done by "medium grade medical workers," a designation given to all trained nurses, and also to a type of medical assistant known as a "feldsher." The last paper, on Culture and Custom, is by Professor Margaret Mead, who discusses the problem of nurses in cross-cultural situations, and the importance of understanding the attitudes and practices of the people to whom they are trying to bring health education.

M. M. Trood

The Closed Treatment of Common Fractures. JOHN CHARNLEY. Third Edition. Edinburgh: E. & S. Livingstone Ltd. 1961. Pp. 272. Illustrated. 50s.

The third edition of this excellent book, though still preserving the original title, devotes considerable space to operative treatment. In the preface to this edition Mr. Charnley says that he has attempted to create a vade-mecum for the junior man, and an interesting treatise for the experienced surgeon. Whether these aims are compatible may be disputed, but there is certainly meat for all here. Balanced traction is now advocated where fixed traction was formerly recommended. The author considers that the ill effects of distraction have been exaggerated, and that it is the soft tissue damage and not the distraction which causes delayed union. However, the distraction produced by the hanging cast in fractures of the humerus is the main drawback of this method. The conservative method of treating fractures of the radius and ulna is described in some detail but strong arguments for operative treatment are presented. Internal fixation of fractures of the lower third of the radius is recommended as a routine except in the aged. Internal fixation of fractures of the mid shaft and upper third of the femur by the intramedullary nail is considered the ideal; but balanced traction is preferred for the lower third. The thorny problem of fractures of the shaft of the tibia is dealt with in some detail. The Phemister technique, using iliac cancellous bone, is advocated after three months where clinical union has not started. Mr. Charnley states that in theory the most efficient method would be a combination of plate fixation and bone chips. In practice too, many surgeons believe this method has much to commend it. The use of the Rush nail is described for unstable tibial fracture

where it can be inserted without opening the fracture. McKee's method of fixation of the tibia with Steinman pins through the tibial tubercle and the os calcis is also described in some detail. While this method is extremely attractive, particularly where there is severe skin and soft tissue damage, it is important to realize that this technique requires practice and experience. This is a thoroughly stimulating book and a valuable companion to every surgeon who deals in accident surgery.

D. J. COWAN

The Public Health Inspector's Handbook (A Manual for Public Health Officers). Tenth Edition 1961. HENRY H. CLAY. London: H. K. Lewis. Pp. 673. 55s.

Recent Public Health legislation has caused the revision of this book. Longer by some 50 pages, and printed on better quality paper than its predecessor, it maintains the high standard of previous editions. The military hygienist will criticize the chapter on disinfestation; Dieldrin is not mentioned, B.H.C. mentioned only as a dusting powder, and pyrethrum stated to be obsolete. Consequently, the treatment of such procedures as mass delousing, control of cockroaches, and ridding aircraft of insects is inadequate and in parts misleading. Nevertheless, the book is certain to find wide favour in Army and Public Health circles.

R. L. Bell.

R.A.M.C. Training Pamphlet No. 4, 1960. Sustaining Treatment Procedures, Other Rank Training. W.O. Code No. 12917. Pp. 69. Illustrated.

The booklet on the whole is very condensed and is of a handy size for carrying on the person In some places it is too brief and more ideas could be given. Nevertheless the book is well set out and the illustrations are very good except for fig 14, which demonstrates a faulty injection technique. The Notes for Instructors might have included a little reminder that the reasons for and complications of the procedures would stimulate greater interest in the recruit and render him more than a man with a very little knowledge and a great capacity for practice alone. The saying "a little knowledge is a dangerous thing "would appear very true of the recruit who is given only a practical training. Several minor items are missed off trays and equipment lists: in Basic observation of patients, temperature and pulse taking, a pencil or pen is missed and Reception of patients has no mention of fracture boards which may be necessary. Sterilization makes no mention of gases such as formaldehyde as sterilizing agents, nor is the no-touch technique dealt with. In General nursing care massage of the reddened area is not mentioned and one finds that most orderlies do not appreciate its efficacy in preventing bed sores. In Care of the unconscious patient, pupil charting is of great importance in head injuries and deserves a mention. Giving fluids by mouth, by gastric tube or by rectal tube might have included a note on the use of continuous rectal feeding, although this and all of the advanced procedures are described very well indeed. It is the little points of which many instructors, I feel sure, would like to be reminded, for they are so likely to be forgotten in trying to "get over" the main points of the procedure. This book is primarily intended for the instructor and surely the finer points should be there for his reference. This little book has long been needed and its addition to the range of training pamphlets will be welcomed by all whose duty it is to train new recruits and others in J. E. BEVAN Mass Casualty procedures.



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All papers intended for publication must be submitted in original type-written copy, double or triple spaced, on one side of good foolscap with generous margins, fully corrected. Any paper not up to these standards may be returned. Authors whose material is based on Service experience are reminded of *Queen's Regulations* (1955), amended July, 1957, para. 680. and are asked to send a copy to the Editor at the same time as writing to PR 1 (a).

There is no set style, but all abbreviations must be avoided. Contributors are on the increase and, with constantly rising costs of production, their papers must be brief. Papers are accepted on the understanding that they are subject to editorial revision, including alterations to condense or clarify the text, and omission of tables or illustrations. Titles must be brief and, if possible, attractive. Lists of References must be on a separate sheet, in alphabetical order, and limited to those mentioned in the text, where they should be in the form "Makewater (1962) observes . . ." or "(Makewater, 1962)." The Harvard system for bibliography is recommended and abbreviations must be according to World Medical Periodicals, 2nd Edition (1957).

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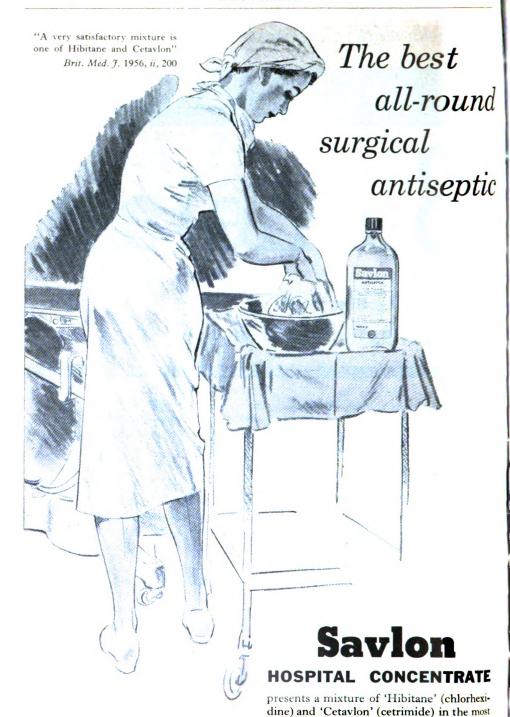
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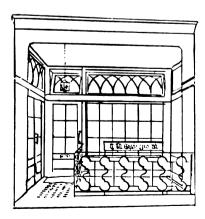
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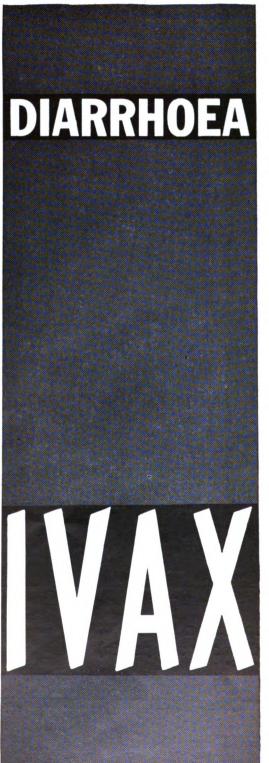
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GENERAL DRUMMOND RETIRES

It is customary for the Journal to mark the retirement of the Director-General Army Medical Services and to salute his successor. For Lieutenant-General Sir Alexander Drummond, K.B.E., C.B., who retired in the spring of 1961, this is far from easy. It may be impossible for those still serving to assess his achievements, for the results of his policies affect us substantially every day. But we should express our gratitude for the tireless energy which he always devoted to the R.A.M.C. General Drummond came from a background both Scottish and South African, and from the day he joined the Corps he immersed himself in it. His strong views and restless drive carried him through a meteoric career. Although he never seemed concerned whether he was popular, he won incredible loyalty from his juniors. His enthusiasm was contagious. As Director-General he made a personal impact on nearly every member of the Army Medical Services. This was made easier by the speed of modern globe-trotting, but his ubiquitous and demonic energy became a legend. During the five years for which he carried the highest office the powers that be were never shadowy and uncertain. They expressed a personality whom everyone knew and discussed. His decisions were swift because he had no time for red tape, from which he had too often suffered

in the past. What he did was bound to be news, and he was alive to the value of news, to an extent unusual in senior officers. He strengthened our Corps academically, adding further impetus to the achievements of his predecessors. For someone who has for so long identified himself with the R.A.M.C. and has in turn been identified with it, in both military and medical circles, at home and overseas, to retire cannot be simple. Generals are notoriously difficult to employ, but we can all be sure that whatever General Drummond may do will be for the good of the R.A.M.C. Our best wishes go to him and to Lady Drummond for a long and happy retirement from their time of service.

MYTCHETT 1961

THE aim of the Director-General's weekend at Mytchett this year seemed to be to examine our most easily neglected job, the cover provided by the Army Medical Services for limited war. To this end the exercise was carefully called a Study Period, the ballyhoo was kept to a minimum, abandoning attempts to impress visitors, and a very workmanlike programme was drawn up. Colonel Ahern deftly outlined the history of the treatment of casualties and of field medical units, said that we wanted to learn how existing units should be reshaped for future needs, and hoped, fruitlessly as it emerged, that the greybeards would not wag too much in discussion. We were introduced by adept crystal-gazers to the possible pattern of future war, with just about as many financial ifs and developmental buts as was tolerable. One speaker, presumably too long immured in a Whitehall planning cell to avoid so schizoid a remark, showed a drawing of a future vehicle and shrugged it off with, "Of course, this isn't at all what it'll look like—it's just an idea of the concept." The Director of Surgery emphasized the principles of handling casualties; his views were soundly based on the past, and he effectively underlined the vital importance of speed in managing wounded. The duologues, setting the scene with the prim dogmatism of the Mytchett cliché were prosey, uninspired and silly. They seemed to quell any lively clash in the discussions, and old hands were convinced that nothing emerged which had not been said some years ago. The Royal Air Force and the Royal Navy were both ably represented, although rather in the mood of "hands off our set-up!" Group-Captain Yerbury provoked much dissension by claiming that since the aircraft belong to the R.A.F., the Air Force alone must be responsible for medical cover during evacuation, and further that it is "axiomatic" that casualties must wait for planes. There seems to be room for better co-ordination between all three services, though Surgeon-Captain Baskerville in an amusing talk justifiably claimed that the commando carrier is by its specialized assault-function precluded from performing as a hospital ship.

A colourful and caustic report from Kuwait drew attention to the continuing disregard by the normal British officer of the simplest needs in adapting himself and his troops to their environment. Army Health is the true heart of our Army Medical Services, yet hygienists are regarded not as teachers but as umbrellas, their presence

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allowing a grateful relaxation of all effort by those they have to educate in selfprotection. Perhaps it was this propaganda aspect of the report which made many smugly assume that the picture had been exaggerated. This same attitude of crass complacency, that things had been worse in previous operations but nothing had gone amiss, was castigated by Lieutenant-Colonel John Matheson, who pointed out how deplorable was everyone's resigned acceptance that the men, materials and money would never be forthcoming in time. Of course the English usually cease to take seriously anyone who becomes so indignant as to lose his temper. Several awkward gaps were largely overlooked, for example the difficulties of collecting casualties dispersed over a vast nuclear battlefield. Lieutenant-Colonel Gray described well how a field ambulance can be overwhelmed by large numbers of casualties. In planning medical cover hardly anyone seemed aware of the ghastly shortage of medical manpower looming on us, and it was mentioned only at the very end. Satisfactory conclusions were few and far between. Much possibly useful discussion was frustrated by the booming irrelevances of persistent speakers, their impassioned oratory only equalled by their lack of thought. They seem to feel it is expected of them to air their ignorance and boast their prejudice.

We shall all have to return often to the problems of our field medical service, not leaving them to the planners. It was a very enjoyable if poorly administered occasion, and we must not be disheartened because a most courageous project did not quite succeed. At all costs the impression must be avoided that these exercises are a ritual unconnected with the development of the Army Medical Services.

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Subscribers to this fund may be interested in the following letter received by the Commandant, Royal Army Medical College, from the Master, Downing College, Cambridge.

The Bursar has already acknowledged the generous contribution to the Lionel Whitby fund which you sent us on behalf of the Royal Army Medical Corps. But I should just like, even though rather late, to send a personal word of thanks. The Fellows and I greatly appreciate the gesture, as well as the practical help, and so, I am sure, will Lady Whitby whom I shall inform of it.

Yours sincerely,

W. K. C. GUTHR1E (Master)



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Lieutenant-Colonel W. O'BRIEN M.D.(Lond.), M.R.C.P., R.A.M.C.

Late Assistant Professor of Military Medicine Royal Army Medical College, Millbank

THE types of heart disease seen in military practice differ from the common pattern. probably owing to three forms of selection. Men in whom valvular or congenital heart disease is recognized are not accepted for the forces; those who develop hypertension or myocardial infarction are invalided before their hearts fail, and most of our patients are between 20 and 40 years old. From 1958 to 1961 we made the following diagnoses in 111 serving soldiers admitted to the Queen Alexandra Military Hospital, Millbank, with cardiovascular disease: hypertension 37, coronary artery disease 28, congenital heart disease eleven, chronic valvular disease ten, lone auricular fibrillation ten, cardiomyopathy nine, pericarditis three and pulmonary infarction three. In one of the patients with cardiomyopathy it was due to sarcoidosis, in another either to "refractory normoblastic anæmia" (Dacie et al. 1959) or to hæmochromatosis, and in a third to glandular fever. The other six patients had obscure cardiomyopathy, an incidence of over 5 per cent compared with the estimate by Wood (1956) of 0.3 per cent in civilian work. Such patients offer an opportunity to study the disease in a population which lives and works in both temperate and tropical climates. Furthermore, in this series obscure cardiomyopathy was the commonest cause of congestive heart failure.

Case 1. A Maltese corporal had lived there all his 37 years. In June 1956 he noticed increasing breathlessness on exertion, and in April 1958 he was transferred to Millbank. He was a small man with a pulse rate of 112/minute, irregular from extrasystoles and of small volume. The jugular pressure was 7 cm. above the sternal angle. The liver was enlarged and his ankles slightly œdematous. The apex beat was displaced outwards with an impulse after the second sound. He had a very loud third heart sound, and an auricular sound to the left of the lower sternum, but no murmurs. There were crepitations over both lung bases. His blood pressure was 115/100. A chest X-ray showed an enlarged heart and pulmonary congestion. The electrocardiogram (ECG) was of small voltage with inverted T waves over the left ventricle. Blood showed 94 per cent hæmoglobin, 9,400 white cells/mm.³ with normal differential, sedimentation rate 4 mm., cholesterol 188 mg./100 ml., and no lupus erythematosus cells. Wassermann and Khan reactions were negative. He responded only for a time to symptomatic treatment of his congestive heart failure, and died suddenly in October 1958, two and a half years after the onset of symptoms. Both ventricles were dilated and hypertrophied: in the left there were small patches of endocardial fibrosis extending into the adjacent muscle with round cell infiltration, and an ante-mortem thrombus at the apex (see Fig. 1). The coronary arteries were normal and there was no infarction.

Case 2. A British sergeant aged 45 was serving in Germany in June 1957 when he lost his appetite and became tired and breathless when walking small distances. He admitted having two or three pints of beer a day and slept better propped up. Later he vomited and had pain in the left lower chest with hæmoptysis. His pulse was regular and from 80 to 120/minute. The jugular pressure was 10 cm. above the sternal angle and he had ankle ædema, but the liver was not felt. His blood pressure was 125/105. He had a loud third heart sound and a soft systolic apical murmur. ECG revealed left bundle branch block (see Fig. 2), and X-ray showed a very large heart and pulmonary congestion. Blood showed 15 gm. hæmoglobin and 425 mg. cholesterol/100 ml., 6,500 white cells with normal differential, a sedimentation rate of 25 mm. and negative Wassermann and Khan reactions. He responded well to treatment of the heart failure, but the triple rhythm persisted and later he had anginal pain and three syncopal attacks. He relapsed into congestive failure and died in December 1958. His heart weighed 1,380 gm. and all its chambers were dilated. The valves and coronary arteries were normal. There were areas of endocardial pallor at the apex of the left ventricle. The muscle was hypertrophied with no infarction but generalized fibrosis.

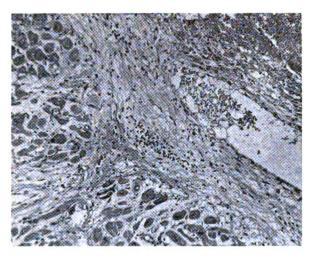


Figure 1. Case 1: Section at the apex of the left ventricle shows ante-mortem thrombus, endomyocardial fibrosis extending into the muscle, and round-cell infiltration.

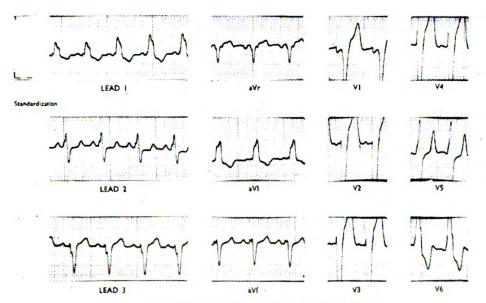


Figure 2. Case 2: ECG showing left bundle branch block.

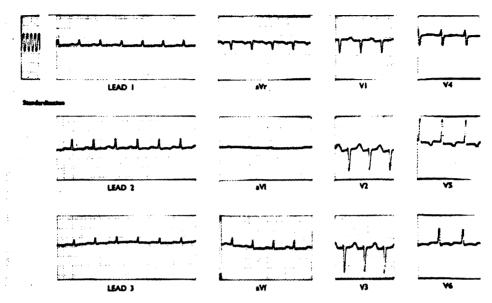


Figure 3. Case 5: ECG shows low voltages and inverted T waves in V₅ and V₆.

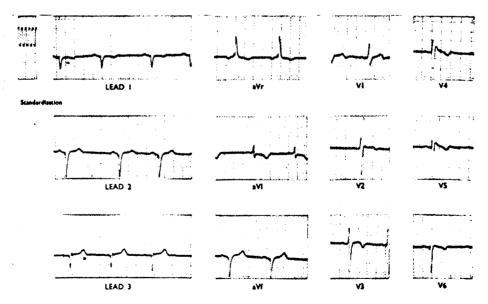


Figure 4. Case 6: ECG shows deep S waves in precordial leads and inverted T waves in V2 to V6.

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Case 3. A British rifleman aged 19 suddenly became breathless on a route march in the Persian Gulf. Two days later he had pleuritic pain on the left which passed off. Four months later on a route march he again became very breathless and remained so, with pain in the right hypochondrium. He had had rheumatic fever at the age of 10, and he admitted drinking as much as he could afford. His father had died markedly breathless at the age of 30. He was a well-built youth, orthopnoeic with a pulse rate of 120/minute, irregular from extrasystoles. The jugular pressure was raised and liver enlarged. The apex beat was displaced outwards, and he had a very loud third heart sound. The ECG showed tall R waves in V_4 and V_5 with sharply inverted T waves in the left ventricular leads, especially V_4 . X-ray revealed a large heart with pulmonary congestion. Hæmoglobin concentration was 15.4 gm./100 ml. and sedimentation rate 2 mm. Both Wassermann reaction and biopsy of calf muscle were negative. His symptoms were successfully treated, although he had another fairly severe pulmonary infarction. Two months later in a civilian hospital he died in congestive heart failure, a year after the onset of symptoms. Both ventricles were dilated and the muscle was hypertrophied with patchy cellular infiltration. All valves and coronary arteries were normal. There were signs of a recent pulmonary infarct.

Case 4. A British warrant officer aged 45 was serving in Lagos in 1956 and became breathless on exertion. He had an enlarged liver and a blood pressure of 130/80. After a time in bed he remained well until March 1958, when he became so breathless that he could only walk a few yards at a time. He also complained of pain in his right side, loss of appetite and ankle swelling. He drank fairly heavily both beer and spirits. His pulse rate was 140/minute, irregular from extrasystoles. Blood pressure was 160/100 with 5 mm. alternation. Jugular pressure was 10 cm. above the sternal angle. The apex beat was hard to find, but the liver was much enlarged. He had a loud third heart sound, a soft short mid-systolic murmur down the left edge of the sternum and rales at both bases. The ECG showed deep S waves in right ventricular leads and inverted T waves in V₃ to V₆, greatest in V₄. X-ray revealed a large heart with pulmonary congestion and a right pleural effusion. Blood had a hæmoglobin concentration of 90 per cent, 6,000 white cells with normal differential, 175 mg. cholesterol/100 ml. and Wassermann, Khan and Price's precipitation reactions all positive. He responded to symptomatic treatment, but the third heart sound remained loud. He died in March 1959 and we have no details of his last illness.

Case 5. A British sapper aged 21 was on an exercise in Germany in May 1960 and had pain in the right hypochondrium followed by vomiting. His pulse was regular at 120/minute and his blood pressure was 90/70. The jugular pressure was 10 cm. above the sternal angle with a sharp y descent. His liver was large and tender. The apex beat was diffuse but not displaced. He had an arricular sound, a loud third heart sound, sometimes a summation gallop, and a soft blowing pansystolic apical murmur. The ECG was of low voltage with sharp inversion of T waves in V_5 and V_6 (see Fig. 3). X-ray showed a fairly large heart and pulmonary congestion. The sedimentation rate was 4 mm., and the leucocyte count 13,000 with normal differential. Biopsy of his tongue and gum revealed no amyloidosis. At first he was very orthopnœic but he responded slowly to symptomatic treatment. He spent a year in and out of hospital with three further attacks of heart failure, the last of which has not responded to treatment. In June 1961 he was transferred to a civilian hospital to be nearer home.

Case 6. A British sergeant aged 29 was found at a routine examination to have a systolic murmur. He admitted to mild but increasing breathlessness on exertion. His father had died in the street at the age of 48. He was a thick-set man looking fit. The pulse was regular at 80/minute and his blood pressure was 140/90. The jugular pressure was normal. The apex beat was slightly displaced outwards. He had no triple rhythm, but a high-pitched mid-systolic murmur on the left sternal edge. There were deep S waves in all the precordial ECG leads and inverted T waves in V_2 to V_6 (see Fig. 4). X-ray showed no definite enlargement of the heart. The sedimentation rate was 2 mm, muscle biopsy was normal, and his blood sugar rose normally after subcutaneous adrenaline.

Discussion

In the first five patients the history and clinical findings were similar: sudden breathlessness on trivial exertion with orthopnœa, quickly followed by symptoms of right heart failure in soldiers otherwise apparently fit; pulse rapid and often irregular due to extrasystoles, low pulse pressure with raised diastolic pressure, and signs of venous congestion; a constant triple or quadruple rhythm with inconspicuous murmurs, though two patients had soft pansystolic apical murmurs suggesting functional mitral incompetence. In one patient the ECG showed left bundle branch block and

in the others low voltage complexes with T waves sharply inverted in the left ventricular leads, most so in V_4 . X-ray showed variably large hearts. All other investigations were negative.

The course was invariably downhill with temporary remissions under symptomatic treatment. No patient has yet survived three years from the start of symptoms. Two patients had pulmonary infarcts and in one of them the illness was dominated by repeated pulmonary infarction. In case 6 the murmur and the ECG suggest enlargement of the septum; the picture is very like the obstructive cardiomyopathy involving mainly the left ventricular outflow tract described by Teare (1958). Two of our patients' fathers had died young possibly with heart disease, and such a family history is not uncommon in obstructive cardiomyopathy. Two patients had taken a fair amount of alcohol, but it is doubtful whether the British soldier can afford to drink enough to produce an alcoholic cardiomyopathy. All but one of these men had served in the tropics or sub-tropics. Post-mortems in three showed no cause for the heart failure: general dilatation and hypertrophy, varying myocardial fibrosis with inconspicuous round cell infiltration, and in two mild endocardial fibrosis. There was no sign of known pathogens, collagen disease or amyloidosis, and the toxoplasma dye and complement fixation tests were always negative.

The first large series of obscure cardiomyopathies was reported by Bedford and Konstam (1946): 40 Africans had congestive heart failure, 17 of them came to autopsy, and endocardial fibrosis was a notable finding. This work was greatly extended by Ball, Davies and Williams (1954) working in Uganda, who in a series of papers described a congestive heart failure in which there is gross endomyocardial fibrosis, extending in many cases to engulf the atrio-ventricular valves. Edge (1946) and Gray (1951) described a similar condition in Europeans who had lived in West Africa. Gillanders (1951) described another condition in South Africa, occurring in grossly malnourished Bantu children, and differing from the Uganda cases in that there was more mural thrombus and no endocardial fibrosis. O'Brien (1954) found that obscure congestive heart failure was also common in Khartoum, but endocardial fibrosis was much less severe than in Uganda. Abrahams (1959) described patients from Southern Nigeria, in whom mitral incompetence and pulmonary hypertension were important features, with occasional hæmoptysis. He found both clinical and pathological evidence of acute rheumatism, and suggested that these patients might show a hitherto unrecognized response to it. With Brigden (1961) he gave a fuller account of 50 patients, mostly Yorubas, who had myocarditis with typical Aschoff nodes, with or without endomyocardial fibrosis. They think that in many of these patients acute rheumatism may have been modified by its environment. Shaper and Williams (1960) also suggested on epidemiological grounds that rheumatic fever might be the cause of many of these cardiomyopathies.

Meanwhile interest in obscure cardiomyopathy was aroused in England by Brigden (1957) and Goodwin (1961) publishing two large series from London. Many of their patients suffered from known forms of cardiomyopathy, such as the familial, or those due to amyloidosis, collagen disease, alcoholism, puerperal myocarditis, hæmochromatosis or sarcoidosis. Toxoplasmosis has also been incriminated, and in infants Coxsackie virus. Trypanosoma cruzi has long been known in America to

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cause an often fatal myocarditis. Nevertheless, the causes of the great majority of these cardiomyopathies remain unknown.

It is interesting that cardiomyopathy might occur as an unusual response to rheumatic fever. We know of great variation in pathological response in different places and peoples to an apparently identical stimulus. Thus, while atheroma is common in many African peoples, myocardial infarction is rare. Acute rheumatism is of special interest to us, being common among young soldiers. It is now thought that endomyocardial fibrosis is due to the incorporation of mural thrombus and is therefore a non-specific finding. Pulmonary infarction is not uncommon in otherwise fit young soldiers and it seems to me more common in the tropics. It is presumably secondary to venous thrombosis. Increased thrombogenesis may lead to endomyocardial fibrosis and it is interesting that one of our patients had repeated pulmonary infarction.

Summarv

Six patients are described with cardiomyopathy. Although its cause often remains obscure, it is not so rare a condition as many are content to suppose. It is also a good example of the valuable opportunities for research to be found in the Army.

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ENVIRONMENT AND TOTAL CARE

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From a paper given at the annual conference of the Director of Medical Services, British Army of the Rhine in October, 1960.

Get to know the soldier, how he lives and thinks and dies. Remember!

The Jungle isn't Harley Street and the Desert isn't Guys.

Unknown military medical writer

"EVERY attention must be paid to economy but I consider nothing in this country so valuable as the life and health of the British Soldier and nothing so expensive as soldiers in hospital." These words were written by the Duke of Wellington in discussing some barrack at Surat in India. The Great Man had, with his usual ability to see what mattered, related the environment of the soldier to his health and had emphasized by implication the need for preventing sickness. His words should be indelibly imprinted on the minds and consciences of all medical officers; they serve to remind us of our primary mission, the prevention of disease in the soldier.

It is perhaps natural that the sympathy and interests of the ordinary man should lie in the quick cure rather than in the long-drawn-out regime of prevention. Today throughout medicine there is an increasing emphasis on the clinical services and perhaps a tendency to judge a medical service by its hospitals. It may be these attitudes which make us apt to forget that our military hospitals are an integral part of a system of total care; that the soldiers admitted to them must all have come from a particular set of environmental circumstances, and that if all goes well, it is to those circumstances they must return. Even under so-called peace-time conditions these circumstances may vary. There will be repeated contrasts of climate, clothes, food, housing, employment, and surrounding social cultures. The environment of the soldier can never be static. Even within Commands this is so. Superimposed upon daily life come changes in tactical and mechanical skills, in training techniques, and in the weapons and vehicles which an army must employ. There will be rapid moves for the soldier, and if he is married, periods of separation from his family with the stress of divided loyalty.

The soldier himself changes, not perhaps so much in his physical attributes as in his attitude towards military service. The Army is a specialized social group within which the soldier inevitably lives the greater part of his life in public. To this group he must give his loyalty, and to it he must make a partial surrender of his personal freedom. The Army no longer lives a life apart, it lives close to the civilian community and the division between the two is less clear-cut.

Today the Army has absorbed into its administration and outlook much of the Welfare State. As far as possible within the limit imposed by movement and strategic

needs, its living and working conditions must match those of a civilian community with a rising standard of living. But even this, however desirable, cannot fully overcome the stresses and strains imposed by the constant change of environment inseparable from an army. The need for continuous adaption remains. Quasi-integration with the civilian population has meant that this need is less well recognized and, what is more important, less willingly attempted by the soldier. He expects that his environment will be manipulated in his favour, rather than that he should attempt to come to terms with it. This can have various results. One is the growing complexity of the administration of the soldier. Another may be poor morale or psychological breakdown; it may be harder to take him to war and keep him at war. The younger age of marriage and the multiplication of dependants both have similar effects.

These thoughts are meant as the background to sickness and injury in soldiers. We must all know the full details of what a soldier in every arm and service may have to do, where he lives and how he lives. Without this knowledge we may not understand the social pathology that brings soldiers to us as patients, and thereby we may fail to see that illness may have an origin in an environment which can be modified or even removed.

The mechanical design of weapons and equipment may injure soldiers. We must be on the alert for such lesions and judge them against employment. Fever and jaundice may appear in the dog handler; dermatitis, skin-staining, blood and liver changes can occur in Ordnance ammunition examiners; a badly designed assault course can give a series of infantrymen fractures of the os calcis. Pulmonary tuberculosis in a regimental bandsman may have been spread to many of his fellows before he reaches a hospital bed. Unimaginative discipline may be revealed at the medical centre in an epidemic of imaginative minor illness and the exaggeration of trivial injuries. A group of accidental injuries and traffic accidents may be due to cumulative fatigue at the end of a large-scale exercise.

These are but a few illustrations in an endless list. We must teach ourselves to think outwards from the bedside or consulting room to the surroundings of the patient. We must never become so absorbed in a case as to overlook its social pathology, which may be reversible; what combination of factors brought this patient to us? In Army Health we are always carrying out social post-mortems to search for the predisposing or ultimate, rather than the intimate or specific, causes for prevailing sickness and injury to the soldier. Lord Adrian has said in a Fawley Foundation Lecture "Without repeated Health Surveys we shall never be rid of the fear that our progress is making the world a more dangerous place to live in." For "world" we may substitute "Army." Sooner or later soldiers are involved in progress which may be peculiar to them, and we are primarily concerned with their health. We must view any departure from this health with concern. Unless we understand soldiers, our concern is futile. We may ignore the environment that made him a patient, and so tend to sit back and await, with growing clinical interest, further cases with a similar pathology. Or we may cure him, only to return him to a place where his trouble will inevitably recur. We may recognize his pathology as being irreversible but not incompatible with his return to work. But unless we know what that work entails, we may hedge it around with so unrealistic a recommendation as "Return to unit; to have small frequent meals and a glass of milk daily, otherwise fit for all duties in an Armoured Brigade Workshop." This is clearly an exaggeration to emphasize the point, but such recommendations are not unknown. The Pulheems Administrative Pamphlet with its tables of trades and employment standards is a useful guide to those who may be remote from working soldiers, gives some idea of possible hazards and may even provide a clue to diagnosis. The ideal, and it is too rare, is the recommendation in line with environmental facts; the information that can prevent recurrence; the observations and suggestions that enable intelligent manipulation of the environmental or successful adaptation of the patient.

An army exists to go to war, so we must remember that idealistic methods for the preservation of its health may impair military skills. Soldiers must be expected sometimes to live alongside hazards. At times it may appear that we have exhausted our capacity to adjust the environment to the individual, and that we must now concentrate on making him equal to his environment. As I have said, the growing complexity of administration may make this difficult, but this does not free us from the obligation to relate soldiers to surroundings. Our attempts at health preservation must sometimes inevitably be an uneasy compromise between the ideal and the reasonable, but such attempts must always be made. The methods we use must always be based on these ideas.

A heavy burden lies on all of us, and not least on the clinicians; it is the primary mission of an Army Medical Service to preserve the health of the soldier. Today the gap between the preventive and clinical services in our Corps shows signs of widening, and our original charter of priorities is in danger of reversal. A military hospital is not an end in itself; it is a component in an overall programme of prevention. The specialty of Army Health stands at the meeting place of clinical and administrative skills. From this vantage point it can see the whole field. What we see is a lack of thinking from the bedside and consulting room outwards with a failure to appreciate the external environment. This means a gap in the soldier's care, a gap that must be closed.

THE FIELD AMBULANCE IN NUCLEAR BATTLE

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This paper is based on personal views conceived two years ago, put into practice in an exercise held in January, 1960, by 162 (City of Cambridge) Field Ambulance, and presented at the Exercise of the Deputy Director of Medical Services, Eastern Command, in March.

THOSE concerned with the direction of our efforts and the management of our military affairs have given an enormous amount of thought to the problems of how the Army should fight the nuclear battle. After 15 years of mental wrestling and exercise wrangling a pattern had emerged with which we are all now familiar. The concept of hard-hitting, highly mobile Brigade Groups loosely grouped and controlled by Divisional Headquarters was cut and dried. More recently, however, this concept has somewhat changed. The tactical unit is now the Battle Group, a force of all arms based either on an infantry battalion or an armoured regiment, commanded by the battalion or regimental commander and depending for its logistics on the Division. The dispersal now covers immense areas, though it is not the task of the Battle Group physically to hold the ground, but to maintain control over it to deliver the major offensive, that is the nuclear weapon. Therefore mobility is now even greater, and Battle Groups may move to new ground several times in 24 hours. With this vast dispersal there may be considerable enemy penetration between Battle Groups, and the whole Brigade Group is constantly threatened from the air flank. Therefore there is no sharp or blunt end; all ends are sharp, and surface communications between Battle Groups or between Battle Groups and Brigade Administrative Area are hazardous, often difficult, and sometimes impossible. The Battle Groups derive selfprotection from their high degree of mobility and heavy hitting power, but the Brigade Administrative Area, containing an array of soft-skinned comparative leviathans, huge shelters, and forests of wireless aerials, is on the other hand unprotected and almost immobile. Even though it has its own infantry battalion or armoured regiment, it is a good deal more vulnerable to enemy penetration and the air flank than are the Battle Groups it supports.

How the medical services should operate within this pattern has not yet been satisfactorily solved, either because less thought has been given to it or because it is a much more difficult question. The problems are those of movement, protection and treatment of casualties under the most adverse conditions. In considering the problems of the present or the future, one naturally recalls past methods to test their efficiency in present and future conditions, to retain those which are proved and still fit, to discard those no longer sound, and to develop new ones to meet new conditions.

Past Deployments of the Field Ambulance

Circa 1946, the dawn of the present era and the newly established Field Ambulance. The fashion was to combine sections, usually two, to form a large Casualty Collecting Post (CCP), and to site it with Company Headquarters (Coy HQ) near Tactical Brigade Headquarters. The Advanced Dressing Station (ADS) was usually sited near Main Brigade Headquarters together with the third section in reserve. In fact this deployment closely resembled that of the Infantry Field Ambulance in the last war, and in the present conditions clearly will not do for two reasons.

The first is the movement of casualties. The infantry battalion then had 16 stretcherbearers, and now has one \(\frac{1}{4}\)-ton truck available in each Company but no stretcherbearers. If we assume a conventional battle with say 50 casualties, each casualty has to be carried to dead ground, to a point where the truck can pick him up, or all the way back to Coy HQ. From there he is driven to the Regimental Aid Post (RAP). The CCP has one \(\frac{1}{4}\)-ton truck with two stretchers to serve each RAP. The ADS has eight Ambulance Cars to serve the CCP, but with the present dispersal of the Brigade Group it would take 36 hours for all the casualties to reach the CCP. By the time they reached the ADS those who survived would require so much resuscitation and major treatment that all would be concentrated in the ADS, and concentration is an anathema anywhere in the Brigade Group Area.

The second is the protection of casualties. Such a concentration of casualties increases the problems of protection. The naïve solution to this in 1946 was that since it is impossible to hide an ADS which is at work, then show it for what it is with a red cross. This red cross not only advertizes the ADS, but it also confirms the vicinity of a Brigade Group. With it as ground zero a nuclear weapon would gravely upset the Brigade Group battle, apart from solving the problem of the further movement of the casualties. That deployment then is a nonsense in present circumstances, so let us move on five years.

Circa 1951 the deployment unfortunately remained more or less the same, but the problem of protection of CCPs and ADSs was receiving more attention. Dispersal was the order of the day and indeed still is, but in rather a different way, for I remember being told by the Inspector of Training that there should be at least 500 yards between vehicles in the ADS, which necessarily means between each department. Therefore the CCP occupied an area of 1,000 yards' diameter, and the ADS some 3,000 yards. What would be the result? Just as the collection of casualties from battalion areas back to ADS is ludicrously prolonged, so now the flow of casualties through the departments of the ADS dwindles to nothing as stretcher-bearers themselves become exhaustion casualties. Furthermore the ADS has become static and impossible to move. That method therefore cannot be applied so let us move on another five years.

Circa 1956 a new method of improving the movement of casualties from point of wounding to ADS was gaining ground. That was to combine the CCP with the RAP to help with casualty collection forward of the RAP, and to speed up first-aid treatment of large numbers of casualties in the RAP. The idea, however, was (and still is) by no means universally accepted, the argument being that if the RAP is not able to cope with the collection and treatment of large numbers of casualties,



then its establishment should be expanded until it can. One might as well argue that if the Brigade Group is unable to bombard a target beyond its range, then its establishment must be expanded to include Bomber Command. The Battalion Medical Officer and his RAMC staff are quite able to cope with normal duties, and in battle when more hands are required to move casualties the battalion can cope to a very limited extent. If more and specialized help is required, then the Medical Services must provide it by reinforcing the RAP with a CCP.

The fashion, then, was to attach a Field Ambulance Section to each Infantry Battalion (though by no means universally) with Company Headquarters near Brigade Headquarters and the complete ADS in the Brigade Administrative Area. But the problem of protecting the ADS still remained, and a sinister three letter cry was heard. It was "Dig!", and a rash of mining operations broke out on all sides. At Annual Camp in 1955 a battalion of an Independent Infantry Brigade dug themselves into defensive positions. It took them a fortnight. No Field Ambulance could ever attempt it, because a little mental arithmetic will soon show that in order to dig in the ADS with 18 inches of head cover it is necessary to shift about 60,000 cubic feet of soil or roughly 3,600 short tons. This means roughly 20,000 foot tons of work to be done or about 265 foot tons per man. If one assumes an average man's capability to be five foot tons per day, it then takes the ADS working day and night nearly two months to dig itself in. If the ADS happened to be sited on rock or even chalk, protection by digging became a nonsense, even if one dismissed it airily by assigning the task to the Royal Engineers. It would therefore appear that in considering our problem of movement, protection and treatment of casualties in the present or future, the methods of the past have become entirely irrelevant. The principles which govern the deployment of the Field Ambulance must be:

No patent concentration of troops, particularly of casualties.

A high degree of mobility.

A wide dispersal of sub-units, but not to the point where treatment and mobility are impaired.

Complete camouflage which inevitably means limited digging.

In the past, though lip service has been paid to camouflage, the object has been defeated by advertizing positions with red crosses and impossible mining operations; vehicles have been dispersed to the point where treatment and mobility become impossible, but worst of all troops have been taken from the comparative safety of their widely dispersed and cosy weapon pits and laboriously collected into Advance Dressing Stations, where a variety of medical graduates, ranging from biophysicists to drug-firm travellers, practised surgery in a primitive operating theatre known as Major Treatment.

This, it must be apparent, will no longer do.

The Present Problem

Let us now, therefore, examine the task of the Medical Services and what it is they are trying to do for a Brigade Group. I say Medical Services because the task is not one for the Field Ambulance alone but for the whole of the Army Medical Services. The task is to remove from the Brigade Area all men who are or will be for several



hours or more unable through illness or injury to maintain their functions as soldiers, and further to render them fit to return to their duties in the Brigade Group. The responsibility of doing this ultimately rests with the Director-General, who has a very knotty problem, but to start this process he has put into the Brigade Group a Field Ambulance whose commander is the Senior Medical Officer of the Brigade. The role of the Field Ambulance, together with the resources available within fighting units, is the collection of casualties, and the rendering of First Aid, which is the alleviation of pain and fear, the control of hæmorrhage and infection, immobilization, and the replacement of blood loss. These broadly are the limits of First Aid and any further procedures encroach on the field of surgery. Of course one or two exceptions spring to mind; the extraction of a tooth, or the removal of a limb attached only by shreds of tissue. Mainly, however, the evacuation and surgical treatment of casualties are the responsibility of the medical services outside the Brigade Group area and are no concern of the Field Ambulance. The job of the doctors, apart from their duties as officers, is not to waste their time and energy in amateur surgery, but to exercise their skill in resuscitation and prognosis in order to establish priorities of evacuation. With the development of new and more effective forms of transport the means of carrying out this role is now, or at any rate will shortly be, at hand. With the advent of the hovercraft, the helicopter, the rotodyne and the light aircraft requiring very short runways, there is no longer any need to concentrate or hold casualties or to do surgery in the Brigade Group Area.

Bearing in mind the pattern of the new Brigade Group battle very briefly alluded to in the introduction, how could the deployment of the Field Ambulance develop to fit this pattern? I do not postulate a new Field Ambulance. I am aware that the establishment of a Field Ambulance is about to be changed, but although I am referring to the present establishment any imminent changes do not in fact affect my general argument.

First, deployment of the company; since a Battle Group is a force of all arms, it will contain a Section of Field Ambulance. I see no point in carrying casualties from one part of a Battle Group area to another and back again. As I have said in a previous paragraph to divorce the CCP from the RAP is a waste of time and transport. Therefore the Sections should be allocated one to each Battle Group and sited close to the RAPs so that they work together at the same task, that is the collection of casualties from all parts of the Battle Group area. Company Headquarters should be adjacent to Brigade Headquarters. Since it is very small and not self-supporting, it should be part of Brigade Headquarters except when it has under command the reserve section from the ADS, when it could tack itself on to this section at a short distance from Brigade Headquarters, say 1,000 to 1,500 yards.

Secondly, deployment of the ADS; the ADS should be split into four component parts, viz Reception, Evacuation, Major Treatment and Administration. Administration consists of the Second-in-Command, Non-medical Officer, Quartermaster, Quartermaster's stores truck and the office truck. This should be close to Administrative Area Headquarters. Reception and Evacuation, though they should be self-supporting, should usually be combined to form a Brigade Casualty Evacuation Area, having with it the Transport Officer, Regimental Sergeant-Major, Dental Officer and



Headquarters General Duties Medical Officer. Major Treatment should be left in the Divisional or Corps Administrative Area as a reserve to be flown up when required. If, for example, a Battle Group were caught on the move by a heavy nuclear strike, the Medical Services would undoubtedly require reinforcement. After such a strike there would be a period of considerable confusion and loss of firm control, and the tendency would be for sub-units and individuals to make off away from the centre. It would be against this peripheral movement that enemy battle groups might operate and it would be some time before the position became clarified. It is during this period that casualties would have to be collected and held for several hours. Major treatment and Reception components should then be flown into the Battle Group area as part of the Brigade Damage Control Unit to carry out this task. No doubt the presence of the Company Commander or Field Ambulance Commander would also be required, and at least one of the medical officers should be someone with surgical experience.

Command under conditions of such wide dispersal must now be considered. Medical Services in the teeth arm area should be commanded by the Company Commander, those in the Brigade Administrative Area by the Second-in-Command. The Senior Medical Officer (SMO) Brigade should not be directly concerned with the tactical command of the Field Ambulance. He should remain in Brigade headquarters as a sort of Medical Staff Officer to the Brigadier, concerned mainly with the collection and transmission of information and with the co-ordination of the evacuation programme. In parenthesis I might say that in my opinion the Divisional Assistant Director of Medical Services (ADMS) should have nothing to do with the deployment or Command of a Field Ambulance in a Brigade Group. The Brigade Group Units including the Field Ambulance are deployed by the Brigade Group Commander, possibly in the case of medical units with advice from his SMO. In my view the job of the ADMS in peace or between battles is constantly to be badgering the Field Ambulances with regard to training, fitness and equipment, in order to bring them to a high state of efficiency. But during the battle, though he may visit his Field Ambulances from time to time, his job is administration at Divisional Headquarters, particularly with regard to evacuation, reinforcements and supplies.

With the wide dispersal I have envisaged of sub-units of the Field Ambulance, additional means of communication become necessary. The traditional means of communication, that is by ambulance cars going backwards and forwards along the Brigade axis, is no longer possible and the Field Ambulance should have its own wireless sets and its own medical net.

In establishing priorities of evacuation, I should draw the line at four hours rather than six hours within which definitive surgery is or is not required. There are thus two priorities of evacuation. The time limit for establishing the third priority, that is casualties so close to death that there is insufficient time to effect their rescue, must of course vary with the flying time to CCS or General Hospital, but it should be very short indeed.

Finally, it is no doubt appreciated that the methods of waging war in the future will depend very largely on the air flank. The maintenance of Battle Groups and Brigade Groups may be done very largely from the air, and evacuation of casualties

from sub-units of the Field Ambulance will be done almost entirely by helicopters. rotodynes and light aircraft. In the sort of battle we visualize involving frequent rapid moves, and where every move is a crash move with little or no preparation, casualties become an embarrassment, not only to the Field Ambulance, but also to the Battle Group and Brigade Group commanders. A very few still in Platoon or Troop positions may be moved with their units, but evacuation from Field Ambulance sub-units must keep pace with casualty collection, not from any consideration of humanity and expediency, but entirely on account of the efficient conduct of the battle. It has been suggested that casualties could be evacuated by aircraft returning from delivering supplies. This is a quite intolerable conception. Casualties cannot be dependent on supply transport. This was established very early in the history of the Army Medical Services when it applied to horse-drawn transport. Merely because transport has taken to the air is no reason to alter the principle. Casualties must be evacuated at once, and this requires a constant shuttle service of aircraft allocated to medical use only. There is of course no reason why such aircraft should not carry stores forward, indeed this was frequently done by ambulance cars in the last war, nevertheless the Army Medical Service must have its own air ambulances.

STERILIZING SYRINGES IN A PRESSURE COOKER

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STEWART (1957) tested syringe sterilization in a hospital autoclave and quoted previous observations. We have used his methods to test a pressure cooker and various syringe containers, taking account of size of syringe, state of assembly, lubrication, humidity, and pressure and time of sterilization. To test all these would have required nearly 3,000 experiments, so the work was simplified by testing a combination of factors until 100 per cent sterility was achieved and then pursuing a different combination. Some 1,600 syringes were contaminated and subsequently tested, with subsidiary tests for special features.

Equipment. A Pentecon pressure cooker was used with safety valves set at 40 lbs./in.² In each test 15 all-glass syringes (five each of 2, 5, and 10 ml.) were used without needles. We used four types of container: glass boiling tubes plugged with cotton wool, metal tubes of Hospital Apparatus Ltd. type, bags of double-thickness linen with a single-thickness flap, and kraft paper. The lubricants were vaseline, silicone and liquid paraffin. The contaminating organism mainly used was Bacillus cereus (N.C.T.C. 9687), which resisted boiling for over ten minutes and free steam for five, but did not survive autoclaving at 5 lbs./in.² for five minutes.

Methods. Before contamination, syringes were sterilized in a hot-air oven. Wet syringes were contaminated by drawing up 1 ml. of culture and exposing the inside of the barrel to it. When the syringe was assembled dry, only the plunger was contaminated by putting it in a culture and drying it off in an incubator. The syringes lubricated before contamination were lubricated before the initial sterilization. Syringes lubricated after contamination were perforce dried between contamination and lubrication. After the test period in the pressure cooker the inside of the barrel was irrigated with 1 ml. of medium, this was expelled into 9 ml. of broth, and the plunger was withdrawn and dipped into the broth too. Broth cultures were examined at 24 and 48 hours, and any growth was plated out to see whether it was the test organism. Two controls were set up: a few drops of the culture in a bijou bottle were included in each load, subsequently put into 10 ml. of glucose broth and incubated; in each test one 10 ml. syringe was treated in the same way as the others but not sterilized to show that the test organism was viable. Tests were done with combinations of pressure (lbs./in.2) and time (minutes) shown as 5/5, 10/10, 15/30, 30/20 and 35/30. In a separate series the inside and outside of both syringes and containers were examined for moisture after sterilization with these same five combinations.

Results

The influence of syringe size. Unlubricated syringes (780), wet or dry, assembled or unassembled, in any type of container, were always sterilized by 15/20. Lubricated syringes (825) were frequently not sterilized (20.7 per cent) by 30/20, and once not even by 35/30. Far more tests were carried out on syringes lubricated before contamination than after, and the interpretation of the effect of time of contamination is unsatisfactory.

The influence of the lubricant. Vaseline was too viscous to apply and remove easily from the syringes, and it became so tacky when hot as to make the syringe useless. The initial results with vaseline were unsuccessful (83 per cent unsterile, compared with 23 per cent for silicone and 25 per cent for liquid paraffin at 15/20) so we stopped using it. There were no significant differences between silicone and liquid paraffin.

The influence of the state of assembly and of humidity. Results at 5/5 and 10/10. using unlubricated syringes showed that 18.9 per cent of dry assembled syringes, 8.8 per cent of wet assembled, 10.5 per cent of dry unassembled and 11.1 per cent of wet unassembled syringes, remained unsterile. These results are more or less what one would expect. The configuration of a dry, assembled syringe protects the organism by preventing the free access of steam, whereas if the syringe is wet there is a local production of steam. In unassembled unlubricated syringes, steam readily reaches the entire surface, and the humidity is of less moment.

The influence of the container has been judged mainly by the results on unlubricated syringes, where the numbers of tests with assembled or unassembled, wet or dry. syringes were comparable. The metal container was most unsatisfactory (25 per cent remaining unsterile) with glass tubes (7.5 per cent unsterile), linen bags (6 per cent unsterile) and kraft paper (none unsterile) far better.

The humidity of containers and syringes after sterilization. Results were little influenced by the pressure and time of sterilization, but the type of container made a great difference. For example, 83.3 per cent of the syringes were dry inside with glass containers, 80 per cent with metal, 36.7 per cent with linen, and 33.3 per cent with kraft paper; 90 to 100 per cent of the solid containers were dry on the outside compared with 6.7 to 20 per cent of the soft containers.

Discussion

The Medical Research Council Committee on the sterilization of syringes (1945) recommended a temperature of 120° centigrade (15 to 20 lbs./in.²) for 20 minutes to autoclave syringes, and they recommended light lubrication with liquid paraffin before sterilization. Our results, confirming and extending the observations of Stewart (1957), show that very many syringes contaminated with a spore-bearing organism would not thus be sterilized in a hospital autoclave, nor at higher pressure/time combinations in a pressure cooker. It appears that the general belief that syringes can be sterilized by autoclaving is wrong, and that only unlubricated syringes can be so sterilized. The maximum thermometer included with each load gave readings which overlapped between the pressure/time combinations. This emphasizes the need for wide safety margins in practice. Many syringes were moist inside when

removed from the pressure cooker, and so could not be used in taking blood for many purposes.

We know no published reference to the advantages and disadvantages of various syringe containers. It may be that our results may prove valuable, for the container can influence sterility. Some working points emerged. Glass tubes are easily broken, heavy and bulky, and need cotton wool, whereas the syringe can be seen inside and only one size of tube is necessary, provided the bottom contains cotton wool. Metal tubes are light, unbreakable, and robust, but their tops tend to jam, the syringe sometimes sticks in the tube, different sizes are needed for each syringe size, the syringe cannot be seen inside, and they are bulky and expensive. Linen bags are light and not bulky, can be re-used, and need be only one size. On the other hand syringes are invisible inside and needles must be protected. Kraft paper is light, not bulky, expendable, cheap, and can be cut to fit the syringe. It shares the disadvantages of linen bags and is more time consuming.

Summary

We have tested a Pentecon pressure cooker as a sterilizer for syringes. It sterilizes only unlubricated syringes. Lubricated syringes probably cannot be effectively sterilized by autoclaving. We used four types of syringe containers and assessed their advantages and disadvantages.

It is a pleasure to acknowledge our debt to Major-General G. T. L. Archer (retired), who suggested this investigation, and gave much help and advice, and to Professor A. C. Cunliffe for valuable criticism. We also thank several technicians, in particular Corporal B. T. Hewitt, R.A.M.C.

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THE MEN OF THE IGMAN MOUNTAIN

General-Major Dr. Djura MEŠTEROVIĆ

Yugoslav Army

It was early in February, 1942, that the "Igman" hospital was set up in an army barracks at Foča near Beograd, and here 172 wounded members of the First Proletarian Brigade of the People's Liberation Army were accommodated. During the night between 26th and 27th January, with the temperature -32°C., they had crossed the Sarajevo Plain and the Igman Mountain sustaining severe frostbite, mostly in their feet. The general condition of the men was poor, and they were exhausted, having had little to eat and having fought almost without rest for six days and nights. Furthermore, the last stage of their march lasted 20 hours with many halts towards dawn on the 27th when the temperature was at its lowest, and when the marchers' boots were saturated with water. Foca was then the centre of our liberated territory and the seat of the Supreme Command, so the conditions for organizing a hospital there were favourable. The frostbite casualties were transported from the Igman Mountain to Foča by sledges and carts over very difficult snow-covered ground. There was virtually no medical care, mostly owing to the lack of supplies, and when the injured reached hospital some eight to ten days later many of the partisans had a high fever and were in a serious condition due to local and general complications.

At first the treatment they received was conservative and insufficient. It consisted mainly of changing dressings every second day. None of the cases were given antitetanus serum since there was a shortage of it, and about 15th February two patients died, one from tetanus, and one of moist gangrene. By the 20th four more patients had died, three from tetanus and one from sepsis. Two reports which were drawn up at the time show that 172 patients were admitted to hospital. Of this number, 22 patients suffered with 1st degree frostbite, 68 had 2nd degree, and the remaining 88 3rd degree. Six of the patients had 3rd degree frostbite of all ten toes, 22 patients had 3rd degree frostbite of five toes on one foot, and the total number of gangrenous toes came to 224.

I was stationed with my team in the Zabljak hospital when in the middle of February 1942 an urgent order came through from Supreme Commander Tito for us to go to Foča immediately. We made the utmost efforts to get there as soon as we could, and arrived three days later after difficult walking over the snow-covered mountain. As soon as I reached the hospital I made a round of all the patients with the doctors who had been treating them and found that over 50 were in a serious condition with high fever. Each patient was in a separate room, and these reeked with the characteristic putrid odour of decaying tissue. The patients all looked exhausted, toxic and sleepless. They complained of great pain in the frostbitten parts, and every movement aggravated the pain. The dressings hurt them, they could not bear the coverlets to touch them, and their feet were exposed. The pain, so they claimed, increased even if someone walked through the room and caused the slightest vibration of the beds. We next went to the dressing station and found that this was a large

room with wooden benches along the walls such as are usually found in military guardrooms. Orderlies brought in the serious cases and laid them on the benches, where they carefully took off the dressings. It was clear that the men were in terrible pain during this manipulation, but they made no sound, as it was considered to be a disgrace for a partisan to complain. The only sound heard would be a deep sigh or a curse against Hitler, Mussolini and the quislings, or else they would quote some slogan from our struggle, thus giving vent to their pain. On the benches there were now a dozen patients with black, mostly mummified, necrotic toes, soles, heels, and terribly swollen feet. None of them showed the classic demarcation line towards the healthy tissue with a clear dry limit. On the contrary the limit between dead and living tissue showed a centimetre wide layer of jellied dirty grey necrotic matter which was chestnut brown deeper down. These necrotic masses infiltrated into the healthy tissue along the bones. In some cases the toes had been removed, but the bones protruding from the tissue were without the characteristic sheen, and were partly dried and necrotic. The bone cartilage was partly detached, opaque and dark grey in colour.

It was clear that something had to be done at once to save these men, but when I told the other doctors present what my intentions were they objected to them strongly. Some considered that conservative treatment should be continued and that one ought to wait for the necrotic parts to drop off naturally. They did not even admit the existence of infection and intoxication. Others were opposed to surgical intervention as we lacked any kind of anaesthetic for such a large number of patients and they considered the men would not be able to stand the terrible pain caused by such "brutality." I proposed a meeting of all the medical officers present in Foča and we discussed the matter until far into the night. Most of them considered any kind of operation without anaesthesia unbearable, impossible, and inhuman. My opinion was that one can and must bear the most terrible torture if this is necessary to preserve life, and I decided on my own responsibility to start operating. Before this, however, it was necessary to gain the support of the men suffering from the frostbite and their agreement to this drastic measure.

In the morning I visited the most serious cases and asked for volunteers, for I knew that if one man would agree, the others would follow suit. I frankly told them what their condition was and explained that their life was in danger if they continued to hesitate and postpone decision. I told them that the operation would be extremely painful but that it was the only solution. I told them that one can bear the worst torture if one is convinced that it is inevitable and that in the end it will lead to freedom from pain and save one's life. Finally one man told me that I could do what I liked with him, for he could bear the pain no longer. The other men looked at him in wonder. This was a man all of whose toes had to be amputated. We carried him to the dressing station where four strong orderlies held him down. No one was present except the doctors and other persons assisting me. I worked without any kind of premedication. With a pair of curved scissors I first cut off all the necrotic tissue right into the healthy flesh. Then with pincers I dug 1.5 to 2 cms. into the tissue, and in one movement cut off the bone. In this way I amputated one toe after the other. Finally I amply sprinkled the wounds with iodoform powder, put on gauze, plenty

of absorbent cotton, and a loose bandage. Then I put on Kramer splints to immobilize the feet. When the operation was over, both I and the patient were dripping with perspiration, I from sympathy and he from pain. That evening the patient still had a high temperature but during the night he slept more quietly than before. The next few days came and went and as they did so he began to feel better, the excruciating pain stopped, his temperature became normal, he was more lively and quite gay, and he could even move his legs and sit on the edge of the bed.

The following day several other men volunteered to undergo the same treatment and in a short while there was no more opposition. Taking example from one another they all agreed to the operation and bore the pain heroically. It is interesting to note that no signs of shock or even collapse were observed in any of the men. Their morale was high and no one wished to appear weaker than his fellow. The fear of disgracing their brigade overcame their fear of pain and kept up their self-confidence and the will to keep themselves in hand until the end of the ordeal.

The post-operative course was similar in all cases. During the first few days after the operation the general and local condition of the men improved gradually. As soon as the body temperature became normal and the pain ceased they began trying active movements. Hardly a month after the operation they were all evacuated to Rudine, a village in the Pivska mountain, where a special hospital was set up for them. Most of the men were completely cured by the next summer and only a small number had open wounds for some time, especially those who had deep and extensive frostbite injuries of the soles and heels.

Finally I would like to emphasize that I have presented these experiences not because I am in favour of surgical interventions without anaesthesia. On the contrary I consider that anaesthesia is essential in all painful procedures. The aim of this report is to show that under special conditions including complete lack of the necessary means, one must try to find, and can find, a way out of even the most complicated situations when the life of the patient is at stake. When such a way has been found, one must be both decisive and persistent.

CHOLERA

From the Lettsomian Lectures for 1961 given before the Medical Society of London by

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For centuries England has been subject to the great seasons of acute bowel complaints, and it is almost impossible today to decide which of them was cholera. Cholera, dysentery and diarrhea attacked both young and old in the London outbreaks of 1669 and 1672, and of which admirable descriptions have been left by Sydenham, Morton and Willis. Thomas Willis says of cholera, "the onset was sudden with vomiting and watery purging accompanied by prostration. I knew a great many that though the day before they were well enough and very hearty, yet within 12 hours they were miserably cast down by the tyranny of this disease." It can be seen in the 18th-century London bills of mortality that this group of diseases returned each summer.

India, especially the south eastern part of the peninsula, has always been the home of cholera, and yet the modern history of the disease begins in 1817 on the banks of the river Ganges. The first of four great pandemics spread in a series of waves by the caravan and sea routes to Europe, and each pandemic had a wider distribution than its predecessor. Each of them spread by land or sea at a speed no faster than man himself could have travelled at the time. In Great Britain these outbreaks were reflected in four great epidemics beginning in 1831. Asiatic or Indian cholera first occurred on the quayside at Sunderland in October, 1831, having been imported from Europe, and soon spread around the country reaching London in February, 1832. At that time England and Wales had a population of about 14 million of whom 22,000 died of cholera, one quarter in London alone. The second great epidemic reached England in 1848, and by the end of 1849 had caused 54,000 deaths, mainly in the large ports and industrial centres. Similar epidemics recurred in 1853-54 and 1866. The former is notable for the brilliant work of John Snow, who first showed that the disease is water-borne.

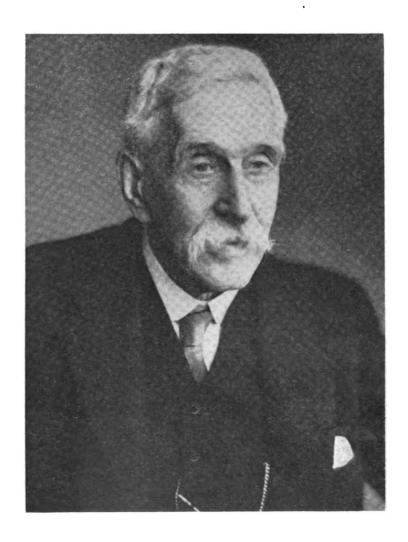
Popular views of the causes of cholera

With so sudden an onset and so rapid a course often ending in death, it is not surprising that cholera was quite early recognized as a specific disease. Many different theories were held about its contagiousness, but I shall mention only some. Though adverse climatic conditions and local circumstances often determined it, and other bowel complaints predisposed towards its development, cholera was considered to be a special poison of Eastern origin. Since not all were affected, it was necessary to postulate a predisposition or epidemic constitution in the susceptible person. It was considered that the patient with cholera gave off the effluvium of the disease. Overcrowding and poor sanitation were considered causes since the theory of miasma was in vogue, the idea being that polluted soil gave off into the air the poison of cholera. The belief in India in this theory is illustrated by the cholera marches. When cholera broke out in a British settlement, everyone, men, women and children, would set out

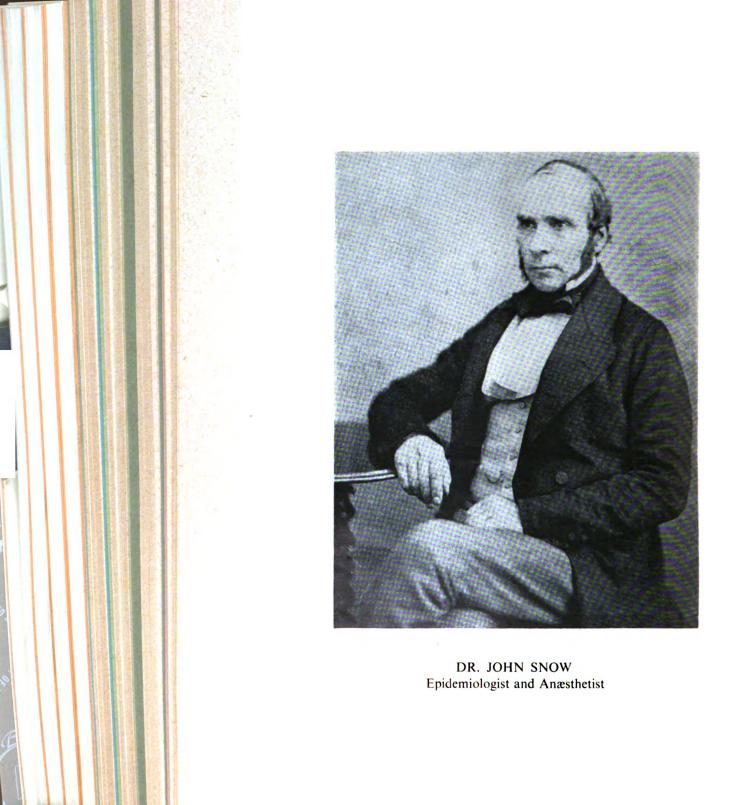
on foot travelling up to ten miles a day and burying their dead as they went. After a few weeks the remainder, a fraction of the former community, would return to the cantonment to begin life over again. Church registers in India give striking testimony of the numbers who died in these epidemics. In Field-Marshal Lord Roberts' time, a young soldier beginning a ten-year tour of duty in India would be fortunate to return home again. Among the many preventive measures used in India, perhaps I should mention the cholera belt made of red flannel, two of which were issued to each soldier.

John Snow and the third epidemic

In 1852 John Snow gave the Annual Oration to this Society on Continuous Molecular Changes, and the London Epidemic of 1854 with more than 10,000 deaths provided him with an excellent opportunity to test his theories. He proved that the spread of cholera was caused by drinking polluted water, and so anticipated the discovery of the cholera vibrio by more than 30 years. He was able to show that in a four-week period the customers who drank the piped water supplied by one company, which drew its water from the Thames, had a 14 times greater chance of dying of cholera than the rest of London. He also proved that clothes, bed linen and hands contaminated with excreta were all means for the spread of the disease. The outbreak of 1854 began in May, and by August the incidence of the disease had gradually increased. The small parish of St. James, Westminster, whose normal population of 14,000 had been depleted by many fleeing from the city, had nevertheless 500 fatal cases in ten days. Since a number of these cases were localized, Snow referred to part of this parish as the "cholera area." The epidemic there began on Thursday, 31st August, 1854, and by the 3rd of September, 83 persons had died in houses close to Broad Street. All but three of them had drunk water from a nearby pump. The patients were admitted to the Middlesex, Charing Cross and University College hospitals. Snow was able to show that the well water had been contaminated with the excreta of cholera patients in adjacent houses and his conclusions "that the sudden severe and concentrated epidemic was in some manner attributable to the use of impure water of the well in Broad Street" were communicated personally to the Board of Guardians of the parish on 7th September. The pump handle was removed the next day. Three illustrations from Snow's account of the outbreak are worth repeating. There was a brewery in Broad Street, the 70 employees of which drank beer. None of them suffered from cholera. Secondly, a fit Army officer went, on the 31st of August, to a restaurant in Wardour Street, where he took an evening meal and drank some spirits diluted with water from the pump. A few hours later he died of cholera. Lastly, an old widow of West End, Hampstead, who had not left home for many months, liked the taste of the water from the Broad Street pump and had a flask of it brought by a cart driver. She drank it on the 31st of August, developed symptoms of cholera on the 1st of September and died next day. It seems extraordinary to us now that there was official opposition to these theories from the General Board of Health, and that John Simon, the first Medical Officer of Health of London, spoke of "Snow's peculiar views." Nevertheless in Britain these cholera epidemics were of the greatest value in initiating and sustaining the urgent need for sanitary



SIR LEONARD ROGERS, F.R.S.



Teform. Edwin Chadwick, the lawyer and sanitarian, William Farr, the medical statistician, and John Simon were not slow in using the awe-inspiring effect of cholera, where a man might be healthy at sunrise and dead of dehydration by sunset, to reduce overcrowding, improve housing, plan sewage disposal and provide safe water supplies. Strict cleanliness, banishment of filth of all kinds, and good drainage became the order of the day with the general approval of Victorian England.

The fourth and last epidemic occurred in the autumn of 1865, when the disease, having been imported from Arabia through Egypt, caused 14,000 deaths in England. In 1893 there was again a small number of cases in the ports of Cardiff and London, brought from Hamburg where the disease was raging. There has been no cholera in this country since, and the disease shrank back to India whence it came.

Incidence since World War II

Just before the last great war there were some serious outbreaks of cholera in the Far East, and it was therefore not surprising that the disease took its toll of some of our prisoners of war in Japanese hands. In 1947 a great epidemic occurred in Egypt two months after the Mecca pilgrimage, when 20,877 persons were said to have been infected with 10,265 deaths. Reliance on strict Army hygiene, rather than on individual inoculation against cholera, ensured that there were no cases in the British troops or families stationed in Egypt at the time. Today in south-east India and in East Pakistan cholera is encountered in both endemic and epidemic forms. In most parts of the latter state the large tanks of water in each village are used for drinking, cooking, bathing and washing clothes. A population of 46 million lives on the delta formed by the Ganges and Brahmaputra Rivers and as there are very few doctors diagnosis and notifying of cases are far from satisfactory. It is not surprising that in the first six months of 1958 more than 10,000 cases occurred with a 40 per cent mortality. In 1959 the disease was widespread in India, Burma and Thailand (Fig. 1) and last

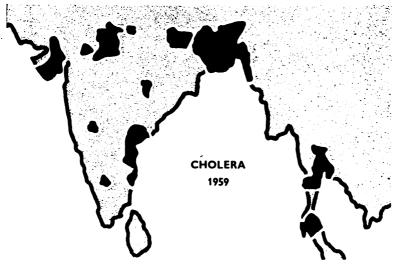


Figure 1. Geographical distribution of cholera, Far East, 1959.

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autumn, following the floods in south-east India, there was another severe epidemic which spread to West Pakistan and Afghanistan. In the last few months, however, this has settled down again, and today south-east India is the only major endemic focus, maintained by the unhygienic conditions in which the inhabitants live.

Ætiology of cholera

The discovery of the comma vibrio by Koch in 1882 opened up a new era. He found this organism in the intestines of victims in Egypt, and later in Calcutta confirmed its presence in human excreta and in water. Osler (1884) has given us a vivid description of the dinner held in Koch's honour on his return at which he said that "given proper assistance cholera would be limited to its native place in India." Unfortunately there exists in water a number of harmless vibrios of appearance similar to those of cholera, and this point was seized upon by Koch's opponent. Von Pettenkofer, Professor of Hygiene at the University of Munich, who believed decomposing organic matter in soil saturated with water was the cause of cholera. To prove Koch wrong he and some of his disciples swallowed a pure culture of cholera vibrios and for some reason did not contract the disease. However, Von Pettenkofer suffered from diarrhæa and one of his pupils nearly died, but not from typical cholera. By 1892, nevertheless, the specificity of the cholera vibrio was generally accepted and when, after a seminar, Von Pettenkofer's views were proved incorrect he drew a revolver and shot himself dead.

We now know that the vibrio does not produce symptoms unless it invades the bowel wall, and that once it passes the gastric barrier it flourishes in the alkaline contents of the jejunum and in the gall bladder. The organism, which is motile and readily cultured, produces a soluble and potent toxin and has characteristic biochemical reactions. Injected into man and animals the toxin produces agglutinins and in some cases hæmolysins, but immunity to the disease is short lived. Fortunately the resistance of the organism outside the body is not great and it soon loses its virulence. The post-mortem findings in a victim are those of an acute catarrhal enteritis with shrunken viscera. With the dehydration the bile is inspissated, the blood viscid and tarry. There is also evidence of kidney damage in variable degree.

After an incubation period lasting from a few hours to a maximum of five days the attack begins in the vast majority of patients with the sudden development of symptoms without warning. In some, abdominal pain or diarrhœa may be an early feature. In epidemics men who have died before diarrhœa and vomiting start may be found lying at the roadside. The clinical picture may be described in two stages; first, evacuation and collapse leading to death, or to the second stage of recovery. The stage of evacuation and collapse begins suddenly with painless diarrhœa and is soon followed by severe vomiting. Fluid gushes effortlessly from the bowel and from the mouth, and at first the vomit and stools are bile-stained but soon become colourless. The stools are likened to rice water from the presence of flakes of mucous membrane. The patient experiences excitement, exhaustion and intense thirst which cannot be appeased. Marked prostration follows rapidly, though the mind remains clear throughout the illness; the face gives the appearance of fear or resignation and the voice falls to a whisper. Cramp-like pains are felt in the abdomen often for the

first time; the recti abdominis muscles pass into spasm and are palpable as hard rounded masses. Oliguria or anuria may occur, frequently leading to death from renal failure. The temperature falls below normal, the pulse disappears, and the face, fingers and abdomen are wrinkled and shrunken. Peripheral circulatory failure supervenes and the patient appears cyanosed and on the brink of death.

The stage of recovery begins if the patient reacts favourably. His temperature, pulse and blood pressure all improve, colour soon returns to the stools and the urinary output increases. In practice one observes that if the patient sleeps and passes urine he will probably recover. Nevertheless fatal complications like hyperpyrexia, bronchopneumonia, cholecystitis or bed sores may develop. It is not difficult to relate symptoms to the underlying pathology. The thick and tarry blood, which is due to a reduced volume, tests the strength of the myocardium; when a vein is opened to receive an infusion it often does not bleed at all. The inspissated bile in the biliary tract accounts for the colourless vomit and stools. Urinary suppression which is reversible in the early stages is due to lack of filtration pressure and renal necrosis.

Diagnosis and Treatment

In epidemics the recognition of cholera clinically is simple and the only safe rule is to suspect the disease in every case of diarrhœa. However, since vibrios are found in loose stools associated with various conditions, careful bacteriological examination must be undertaken as quickly as possible to confirm or disprove the diagnosis of cholera. Experience of the disease soon teaches the urgent need for early bacteriological diagnosis, for this is the only way that cholera can be diagnosed and brought under control. Smears of stools stained and examined microscopically will reveal cholera vibrios in teeming millions, but on culture they can be identified with certainty. It is not unusual for sporadic cases to be confused with food or metallic poisoning, or with pernicious forms of malignant tertian malaria. In epidemics mild cases often recover spontaneously. Nevertheless the fate of the average cholera patient depends to a large extent on the duration of the stage of evacuation and collapse. Compared with adults, children do not long survive dehydration. In epidemics the mortality rate may reach 50 per cent, but in the few highly selected patients who reach hospital prompt replacement of fluids and electrolytes will produce recovery in nearly all of them.

Strict isolation of a cholera patient is essential and good nursing is an invaluable aid. The earlier symptomatic treatment is begun, the better are the patients' chances of survival. Rapid restoration of the body fluids and electrolytes, so seriously depleted by diarrhœa and vomiting, will give prompt relief to the thirst and muscle cramps which are among the worst subjective features of the disease. Immediate intravenous infusions of saline are vital, the first pint being given quickly, the second more slowly and subsequent amounts as indicated by using the accepted principles of fluid balance. It is usually necessary to cut down on a collapsed vein and insert a cannula. Not more than five to seven pints should be given in the first day for it is dangerous to overload the circulation, especially if renal function is impaired. Small sips of fluid by mouth should be given but these are usually returned. Ideally, determinations of serum sodium, chloride and later potassium are desirable, but in practice under primitive

conditions, reliance may have to be placed on clinical judgment and on simple procedures like pulse and blood pressure determinations and urinary chloride estimations. Since the blood alkali reserve is diminished, the addition of sodium bicarbonate to the infusions is recommended. The best known formula which also contains potassium and calcium salts is that recommended by Rogers. The effect of these infusions is quickly apparent, since the pulse and blood pressure soon improve, the cyanosis lessens and the skin becomes warm. It is wise to keep the patient warm in the early stages and cool when the stage of reaction sets in. Hyperpyrexia is combatted by vigorous cold sponging. Among the dangers is the presence of pyrogens in the infusion fluids, which can cause fever and rigors.

In the past many empiric forms of treatment were in vogue, among them intestinal antiseptics, potassium permanganate pills and a mixture of volatile oils, all of which were of unproved value. Today chemotherapy offers hope of destroying the vibrio. Insoluble sulphonamides given by mouth in full doses, if retained in spite of the copious vomiting, have good effect. While streptomycin and chloramphenicol are favourably reported on, the use of bacteriophage is still controversial, and gallons of it have been prescribed with as little visible effect on the patients as an equal quantity of water. Antibiotics and sulphonamides tend to be more useful in the early stages by reducing the enormous number of vibrios in the ejecta, thus reducing the infectivity and tending to limit spread of the disease. Cortico-steroids are recommended to combat suprarenal insufficiency and nor-adrenaline may be required to prevent circulatory failure. During convalescence the diet may be increased gradually and it is well to be certain that the patient's stool no longer contains the vibrio, even though the chronic carrier is a rarity.

Prevention

All efforts must be directed at general prevention of cholera. The local population must be inoculated with cholera vaccine immediately, a second dose of the vaccine being required a week later. The hospital staff, similarly protected by inoculation, should wear rubber gloves and overalls while attending the patient, wash their hands in weak biniodide solution, and eat nothing with the fingers. Stools and vomit must be carefully disinfected with strong bleach paste or cresol. All foods for the general population should be cooked, raw fruits, melons and salads being unfailingly avoided. All water should be sterilized, and superchlorination is advisable as a temporary measure. Tea, made with boiling water, is always a safe drink. Dilute hydrochloric acid taken with meals is usually recommended.

Finally a tribute is due to a former Lettsomian lecturer, Sir Leonard Rogers, now aged 93. His 30 years' research on the control of cholera epidemics, completed only in 1955, has formed the basis for controlling cholera in India by the compulsory inoculation of pilgrims. No man living has done more to prevent epidemics spreading within and beyond that continent. This is, so far, the most spectacular achievement in the struggle against the cholera vibrio.

(To be continued)

NAPOLEON'S SEX LIFE

Major-General F. M. RICHARDSON C.B., D.S.O., O.B.E., M.D. (retired)

When I recently refused a request by the Editor for a contribution to the Journal it was because I had unhappy memories of all the work which I put into a rather racy account of the Director-General's 1959 Exercise, at the special request of his predecessor, who was then unable to print it, for reasons beyond his control. I realized, however, that by sending him this essay I might be compensated for that disappointment in a way which anyone who reads it will understand. The essay was written some two years ago to prove to Sir Dudley Ward, then Commander-in-Chief, British Army of the Rhine, that some remarks which I had made at a dinner party given by him to the Chief of the Imperial General Staff were not merely a flippant result of his hospitality and excellent brandy. I must confess that my remarks did spring from hostility to the man who was mean enough to leave a legacy to a Frenchman who attempted to assassinate the Duke of Wellington, whom many readers of our Journal know to be my favourite hero.

Napoleon has less to fear than most great names of the past from the modern sport of knocking down popular idols. In Jacques Bainville's Napoléon (1931), said to be one of the greatest biographies, the last chapter is called La Transfiguration, and begins: "L'incomparable météore avait achevé sa course sur la terre. Il avait pris ses mesures pour qu'elle ne s'arretât pas. Mort, Napoléon s'anime d'une vie nouvelle. Après tant de métamorphoses, voici qu'il devient image et idée." The humiliation of defeat was soothed by the memories of past glories, and Napoleonic literature grew into a mountain. The failure in 1870 of "Napoléon le Petit" merely increased the glory of "Napoléon le Grand." "La figure du César, vaincu et renversé pour la troisième fois dans son pâle heritier, n'en resplendit que mieux. Désormais sa puissance est spirituelle." The Napoleonic legend is essential to French national morale, and is thus a Nato asset which should be approached with caution, though it is obviously indestructible, having survived the undoubted fact that millions of Frenchmen execrated his name when he was alive and at the peak of his fame. This is well illustrated in a book by a Dutch writer, Pieter Geyl (translated into English) in which the anti- and pro-Napoleon literature is analysed. Jacques Bainville is slightly hostile, and Jean Savant (1954) positively venomous in his Napoleon in his Time, which is a miscellany of quotations from those who knew him best.

It is not difficult to see why he eventually lost the confidence and affection of many of his marshals and his staff, as his megalomania and disregard for human life became more evident. Marmont, in excusing his so-called betrayal of Napoleon, which gave to the French language for Bonapartists a new word, "raguser," but which Wellington always denied was any betrayal, summed it all up like this: "When Napoleon said 'All for France' I served with enthusiasm; when he said 'France and I' I served with zeal; when he said 'I and France' I served obediently; but when he said 'I without France' I felt called upon to leave him." Sir John Fortescue says that in 1809 he was "already succumbing to the defect which eventually brought him to

ruin, namely a tendency to confound assumptions with facts." His categorical orders from France to his marshals in the distant peninsula, without regard for the facts as they knew them to be, must have been maddening. Lord Algernon Cecil, in his book Metternich, describes how on the way into his celebrated interview with Napoleon in 1813 Metternich was stopped by Berthier, Napoleon's chief of staff, whose grave disquiet was evident. "'Do not forget' the marshal pleaded, 'that Europe requires peace, and especially France which will have nothing but peace.' Metternich passed in without a word, his hands, however, so much the stronger for the knowledge that the schism, of which Talleyrand and Fouché had apprised him as much as four years before, between France and Napoleon had spread even to the Emperor's very chief of staff. His policy, not Napoleon's, was that of the French people." It was at that interview that Napoleon made his celebrated remark, "I was brought up in the field and a man such as I does not concern himself about the lives of a million men." He put his foot in it in many other ways, and it was not long of course after that interview that the marshals were compelling him, in Fontainebleau, to sign his abdication, and Ney was replying to his remark that the army would obey him, with the statement that the army would rather obey its generals.

There is a great deal of evidence, apart from the well-known remark, that his attitude to casualties was calculating and brutally callous, and in marked contrast to that of Wellington, who wept over the casualties, and said to Lady Shelley, "I am wretched even at the moment of victory, and I always say that next to a battle lost, the greatest misery is a battle gained." Napoleon's morbid curiosity in looking at the casualties on a battlefield has been frequently described, and S. J. Watson in By Command of the Emperor (1957) suggested that "it reinforced his sense of power to see how many of his own troops had met with death and mutilation in doing his will." Viewing the ghastly slaughter at Borodino he said it was the most beautiful battlefield he had ever seen, and he described the piles of corpses on the dreadful field of Eylau as "small change" actually turning some of them over with his foot; and it was perhaps there that the affection of his adoring troops first began to waver.

J. G. Lockhart, writing in 1829, quoted Bourrienne, an old school companion of Napoleon and later his secretary, that, "his heart was naturally cold," and even in youth he was "very little disposed to form friendships" (tres peu aimant); and Lockhart says, "The most wonderful part of his story is the intensity of sway which he exerted over the minds of those in whom he so seldom permitted himself to contemplate anything more than the tools of his own ambition." It will surely not rock the Nato boat to attempt to understand how he achieved this sway, by taking a peep into some of the corners of that astounding mind, even though Bainville says, "On a fait de Napoléon mille portraits psychologiques, intellectuels, moraux, porte sur lui autant de jugements. Il échappe toujours par quelques lignes des pages ou on essaie de l'enfermer."

"Male and female created he them," says the Bible, with possibly unintentional accuracy, for I suspect that the author of Genesis really meant "male or female." The Reverend E. M. Davis, however, senior Jewish chaplain, British Army of the Rhine, in an article in the Royal Army Chaplains Department Journal, December 1958, says, "The Rabbis stated in the Talmud 'Adam and Eve were at first one being."

This is a surprising anticipation of the modern notion of a primitive bi-sexual creature." In all human beings there are elements of maleness and of femaleness in varying proportions; and just as variations in the proportions of male and female hormones result in wide variations of physical types, so do psychological mechanisms of great complexity growing within our minds from childhood influences and experiences, and from the conscious or unconscious interpretations which we put upon these, combine to produce variations in our emotional attitude to sex as many-hued as the rainbow, with, at opposite ends of the spectrum, the strongly heterosexual and the strongly homosexual. A good deal of unhappiness results from people not knowing just where they fit into the spectrum. Many unhappy marriages result from failure to realize the complexity of this range of colour; from one or other partner feeling deprived because the other does not perhaps live up to their imagined type of the perfect lover, founded upon romantic literature, the stage, or the screen.

Having read only an infinitesimal fraction of the massive Napoleonic literature I can present only a few symptoms in attempting a diagnosis of where Napoleon fits into the sexual spectrum, but I suspect that a diligent search, and especially access to secret state papers, would yield a lot more. I have not read Napoléon et les femmes by Masson, nor a recently-published book called Napoleon in Love by R. F. Delderfield; but I doubt if they would affect my tentative diagnosis of his psychological make-up. For a start it is profitable to have a look at his physical characteristics, beginning at the end with a highly-significant post-mortem report. "The body was found enormously fat" with "a coat of fat an inch and a half thick" over the breast bone. This helps to dispel the popular fallacy that the cruel British let him die of cancer, and indeed a surgeon lieutenant-general of the French Army, Raoul Brice, in his big work The Riddle of Napoleon diagnoses the cause of death as the perforation into the stomach of an amæbic liver abscess, with subsequent gastric perforation and peritonitis. The "red spittle" which Bertrand describes as covering his vest towards the end, could have come from such an abscess. So much for cancer.

Walter Henry, surgeon of the 66th Foot, who was present, thus describes his external genital organs, "Partes viriles exiguitatis insignis, sicut pueri, videbantur," and from this and other evidence Brice concludes that Napoleon suffered from a condition called Fröhlich's syndrome (dystrophia adiposo-genitalis) which makes paternity highly improbable. His later portraits amply corroborate this diagnosis, though it may be a little harder to reconcile it with those early portraits of the hawklike young general with spaniel ears and hair down to his shoulders. of them that hair is fine and silky as it is in Fröhlich's syndrome. By the time that he was famous enough for contemporaries to describe his appearance he seems to have been plump, with "beautiful little pink hands" (Duchess of Abrantes), "delicate and plump with taper fingers" (Meneval), which are characteristic of the condition, and help to produce the rather feminine appearance in these people. Captain Maitland of Bellerophon said, "His hands were also very small, and had the plumpness of a woman's rather than the robustness of a man's." Now this condition usually occurs at or before puberty, but may begin later from a number of causes, which include syphilis. Without probing too deeply it may be said that Napoleon seems to have incurred the risk of this, and one of the commissioners taking him to Elba remarked that he was suffering from an "amatory complaint" for which he applied treatment in their presence without reserve. Other possible symptoms need not be detailed. Incidentally an authoritive medical text-book states that the syndrome is often associated with intellectual ability "above normal."

If, as Ludwig suggests, Napoleon's whole outlook on life, his destiny, and the history of the world were profoundly affected by early mortification and affronts "suffered at the hands of a few silly young marquises"; and if, as so often happens. feelings of inferiority aroused by his small stature encouraged aggressive impulses, his poor sexual endowment may well have intensified such feelings by what Adler calls a sense of "organ inferiority." This would certainly account for his rather aggressive attitude towards sex, the interest he took in that part of other people's private lives, and particularly for the besetting anxiety about his inability to produce an heir by which he is well known to have been tormented. Perhaps it also helped to drive him into the arms of Josephine, an experienced and loose-living widow whom he took off the very knee of Barras. His bargaining for a wife, described by Savant under the heading In Quest of a Dowry, included a determined attempt to marry, without any suggestion of love, a Mme. Perron, old enough to be his mother. Josephine had little cause for complaint, for if Barras is to be believed, her bargainings for a husband were just as blatant, and she seems to have been, like Napoleon's sister Pauline, a nymphomaniac who was ready to have affairs with generals, their aides-de-camp or their grooms. Josephine had not much money, but the "dowry" was enough—for it was command of the army in Italy. Both of them confided in Barras before marriage was proposed, and Napoleon's remarks included, "I've not been trying to seduce a virgin. I am the kind of man who would rather find love ready-made than have to make it."

Savant mentions altogether five women with whom Napoleon contemplated marriage before he asked Josephine. The best known is his attractive young sisterin-law Desirée Clary from whose marriage to Bernadotte the Swedish royal family Savant says that she was his mistress but gives no authority for this. are descended. Napoleon at St. Helena described her as his first love, and said she was most upset by his marriage to Josephine. He said to Bertrand that she once hid under his bed. and he claimed that "it was because he had taken her maidenhead that he created Bernadotte a marshal, prince and king." But it was certainly not he who made Bernadotte a prince or a king, and it is probable that his claim to have seduced her sprang partly from a desire to hurt Bernadotte for whom he had long had a jealous hatred, which was cordially reciprocated, and partly from his habit of boasting of his successes with women, to which he often gave way in St. Helena. Caulaincourt had noticed that he took great pleasure in talking of early love affairs, and of "the preference a number of society women had given him over some of his comrades then more prominent than himself." People who talk a lot of their love affairs have not necessarily had any; indeed they may feel the need to bolster up their self-esteem in this way if they are a bit doubtful of their prowess in this sphere. It seems far more likely, considering his physical handicap, that he felt doubtful of his ability to satisfy an attractive young bride, and sought not only material advantages but sexual help and encouragement from the only too experienced Josephine. Indeed he more or less admitted this to Bertrand at St. Helena, saying, "To tell the truth I only married Josephine because I believed her to possess a considerable fortune. Also I wished to make myself appear more mature." He claimed to have loved her, but to have had no respect for her, and he made the slightly significant comment that "she had the prettiest little tail imaginable." He often treated Josephine most unkindly long before the final cruelty of the divorce, but she had her revenge in the way she spoke of him on what, as I have hinted, may have been his tenderest point. She spread the mot that "Bon-a-parte est bon-a-rien" and described his incapacity in crude and indecent terms. When she knew that he was contemplating a second marriage to get an heir she made to Mme. Duchatel and others such statements as "that the Emperor was no use at all, that she had had children by her first husband, and that while she was still a comparatively young woman she had married the Emperor who had been able to do nothing."

(To be continued)

"For all journals, above all, should convey excitement and the delight of the people making them."

ALAN HATCH in About Town

SCRUB TYPHUS IN HONG KONG

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BEFORE World War II scrub typhus or Tsutsugamushi fever was a disease of the Far East and a matter of academic rather than practical importance to those outside oriental countries. Many previously isolated areas of South East Asia have since been crossed by armies, so that the prevention and treatment of scrub typhus has become a problem of immense military importance. The disease has been recognized for many years in Japan, where it is called Tsutsugamushi fever and where the peculiarly localized character of the endemic foci of the disease is well known. Indeed such foci have been given the name Yudokuchi or poisoned places by the Japanese (Nagayo 1923). Lewthwaite and Savoor (1940) were able to demonstrate that the scrub typhus occurring in Malaya was identical with Tsutsugamushi fever; while the local character of outbreaks was emphasized by many workers (Tattersall, 1945; Audy, 1949; Lawley. 1957). Scrub typhus tends to occur in certain types of terrain in which infested rodents are found. The particular terrain is well described by Audy (1949) as consisting of man-made wasteland and neglected gardens at fringes of villages; grassy river banks and "hedgerow" areas where grass or open scrub is flanked by woodland, or where bushy hedgerow occurs in valleys or in dried-up streams.

The organism causing scrub typhus was distinguished as *Rickettsia orientalis* by Sellards in 1923. The mites acting as vectors are two closely related species of trombiculid, *T. akamushi* and *T. deliensis*, while the chief vertebrate reservoirs of infection are rats, voles, shrews, and possibly other small rodents. Audy and Harrison (1951) prefer the terms mite typhus and *R. tsutsugamushi* to describe the disease and its causative organism.

Although scrub typhus is described as being distributed in patches over the whole oriental region, Hong Kong is rarely if ever mentioned specifically as an endemic area. Indeed Stewart (1954) is credited with publishing the first serologically proved cases, five in 1949, and ten in 1950. The disease has, in fact, been recognized by various medical men in Hong Kong over the years, and has been notifiable since 1946. One hundred and six cases have been notified, but such figures are almost certainly incomplete particularly for the Chinese population. This paper reports an outbreak of scrub typhus among British troops in Hong Kong in the summer of 1960 arising almost entirely from a very localized area or Yudokuchi.

Epidemiology

The First Battalion Royal Northumberland Fusiliers moved from Fanling on the mainland to Stanley Fort on Hong Kong Island on the 7th May, 1960. They stopped taking their prophylactic paludrine, for Hong Kong is a "non-malarious" area. On 20th and 21st June the Battalion carried out an exercise in the area of Tytam reservoir. During the course of this exercise No. 5 Platoon under the command of Case 1 rested for two hours in a small clearing near the junction of Shek-O Road with Island Road (Grid reference 140.641). Other members of this platoon were cases 3, 4, 5, 7 and 9. Case 2 was in command of No. 4 Platoon, which contained cases 6 and 8. This platoon had also rested at this spot on the previous evening. Case 10 was in a different company, but had also stayed in the same spot for two hours during the exercise. This small clearing is surrounded on three sides by long grass, bushy undergrowth, and a few low trees. The ground falls steeply away to a valley on one side. Most of the men had sat or lain on the ground. None of them had noticed being bitten at the time.

Case 11 was an officer from the New Territories who had spent a day of leave with friends at Tytam Tuk pumping station near the reservoir. During the day he had walked barefoot in long grass and low scrub. Cases 12 and 13 were sporadic cases also occurring during the summer months, who had both been out on exercises in the New Territories on the mainland.

Clinical Features

The clinical features of most cases followed the classical pattern of scrub typhus and are well illustrated by Case 1.

An officer aged 27 was admitted to hospital 16 days after the exercise complaining of severe frontal headache, nausea, fever, and rigors for four days. He was a flushed toxic-looking man with a coated tongue and injected conjunctivæ. His temperature was 104 F., pulse rate 90 and respirations 20/min., with blood pressure 130/85. There was a fine macular rash over his trunk and abdomen, while in his left axilla there was a rounded eschar about 4 mm. across with an indurated pink rim on a firm crusted yellow centre. Enlarged firm lymphnodes were palpable in the neck, axillæ and groins, and the spleen was enlarged two fingers below the costal margin. Trophozoites of benign tertian malaria were found in the first 36 hours. Treatment was started with chloroquin without clinical benefit or fall in temperature. On the second day he suffered from a transient deafness. On the third day chloramphenicol was started, and the temperature fell to 100 F. within 24 hours. Although the fever subsided completely and he felt better, over the next few days he developed a dry cough with fine crepitations in the right chest and his blood pressure fell to 75/50, presumably due to myocardial involvement. Meanwhile the centre of the eschar became a black slough, which subsequently separated. At this stage he had received 9 gm. of chloramphenicol spaced over four days and appeared much better apart from the hypotension and general malaise. On the tenth day, however, he again developed a fever of 104 with headache and rigors, and he was given a second course of chloramphenicol (7.5 gm.), which this time produced a complete remission with temperature and blood pressure returning to normal.

This was the first and most severe case, with most of the features of scrub typhus. Several of the other patients had a much more pronounced maculo-papular rash, involving limbs and trunk, while others had the very suffused "alcoholic" facies. One or two complained of transient photophobia and had slight neck stiffness, indicating possible meningeal involvement. The clinical features of all the cases are

Showing the main clinical features of thirteen cases of scrub typhus seen in Hong Kong in 1960

Initial W.B.C. (Hb)	3,900 (100%)	6,800	3,200 (100%)	2,600 (100%)	5,200 (96%)	10,500	4,400	6,800 (100%)	5,100 (100%)	4,200 (98%)	2,900	10,000 (100%)	4,000 (96%)
Urine	∢ m⊃	m ⊃	∢ ⊠⊃	∀® ⊃	۷D	В				<	ב		∢ ⊠⊃
Splenomegaly	- -	+	+	+	+	1	+		+	+			+
Lymphadenopathy	+	+	+	+	· 1	+	+	+	+	+	+	+	. (
Rash	-+	+	+	+	1	-1	1	+	+	+	+	+	1
Eschar	+	1	٠.	ı	ı	Ī		1	1	+	1	+	ĺ
Rigors	1	+	+	l	+	-4-	+	ı	1	1	ı	1	+
Fever	Up to 104°	Up to 105°	Up to 104°	Up to 104°	Up to 104	Up to 104°	Up to 101	Up to 102°	Up to 103°	Up to 103°	Up to 103°	Up to 101°	Up to 104.5
Headache	+	ŧ	+	4-	+	+	+	+	+	+	+	+	+
Incubation Period	12 days	12 days	20 days	14 days	12 days	16 days	12 days	17 days	16 days	17 days	16 days	ć	٠.
Case No.	-	2	e .	4	8	9	L:	∞	6	10	11	12	13

UROBILINOGEN

BILE PIGMENTS

ALBUMEN

set out in Table I. Table II compares the incidence of various symptoms and signs found in different reported outbreaks. From these tables it will be seen that in the present series rash and splenomegaly was more common than in most, while eschars

TABLE II

Clinical findings in 13 cases of scrub typhus expressed as a percentage and compared with other reported series.

Symptoms	Webb & Hughes (1960) Hong Kong 13 cases	Boyd (1935) India 35 cases	Lewthwaite & Savoor (1940) Malaya 250 cases	Tattersall (1945) India 500 cases	Doherty (1956) Australia 53 cases	
Headache	100%	100%	92%	100%	90%	
Flushing and Cyanosis	Common	Common		100%	_	
Eschar	23%	Nil	5%	11%	36%	
Rash	77%	50%		44%	45%	
Conjunctival injection	Common	Common	40%	76%	_	
Pharyngitis	Common	Nil	_	34%		
Splenomegaly	70%	Nil	80%	47%	8%	
Adenopathy	90%	Nil	40%	92%	72%	
Chest Involvement	Common	23%	80%	60%	27%	
Myocardial Involvement	8%					
Deafness	8%		66%	35%	_	
Mental Involvement	30%	Common	35%	100%	_	

were relatively uncommon. The incidence of eschar seems to vary considerably in reported series. Fairley (1956) rates it as high as 60 per cent, but many would put it at half this figure, or less. In this outbreak the incubation period tended to be rather long when compared to the usually quoted range of 6-18 days.

Laboratory Investigations

These were limited to white cell count and hæmoglobin, blood films for malaria, urine examinations and agglutination tests. No one was anæmic. An initial leucopenia was almost constant, counts of over 7,000 white cells/mm.³ being found in two cases only, and parasites of benign tertian malaria were found in three. In the acute phase of the illness bile pigments were found in the urine in six cases and a trace of albumen in seven. The results of the differential Weil-Felix agglutination tests are shown in Table III. It will be seen that although suspensions of *Proteus* OX K agglutinated in very high dilutions in some cases (e.g. 1/1,280 in Case 1 and 2), in others there was little or no rise in titre. A rising titre is apparently more important than the actual level reached, but a figure of 1/160 is regarded as highly suggestive (Adams and

Maegraith, 1953). In five cases the titre did not reach this level although in four content them (Cases 4, 7, 8 and 9) there was a small rise. There was no conformity regarding the stage of the disease at which maximum titres were reached; on the whole they

TABLE III

PROTEUS OX K AGGLUTINATIONS IN THIRTEEN CASES OF SCRUB TYPHUS
HONG KONG 1960

Expressed as dilutions during successive weeks of illness. The actual day of illness is shown in brackets.

Case No.	Week 1	Week 2	Week 3	Week 4	Week 5	Weeks 6 -
1	_	80 (10)	_	1,280 (24)	_	160 (39)
2		80 (9)	_	1,280 (23)	_	320 (40)
3	80 (2)	320 (9)	_	_	160 (31)	160 (42)
4		20 (14)	80 (21)	80 (28)	_	_
5		_	320 (17)	320 (24)	_	160 (30)
6	80 (5)	160 (12)		_	160 (34)	_
7	_	40 (9)		80 (23)	80 (30)	40 (40)
8	_	40 (10)	80 (18)	80 (24)		
9	20 (5)			40 (25)	_	
10	_		-	80 (25)	_	80 (40)
11	80 (5)	320 (11)	_		320 (32)	
12	320 (3)		640 (19)		_	
13	80 (7)	320 (14)	_	160 (23)	_	

tended to be greater about the fourth week. High titres tended to be associated with severe illness. Suspensions of *Proteus* OX K only were regularly agglutinated, the geatest rise in *Proteus* OX 2 and *Proteus* OX 19 being 1/40 and 1/80 respectively. Agglutination with the typhoid group and *Brucella abortus* suspensions were constantly negative. Paul Bunnell tests carried out on Cases 8, 9 and 11 were negative.

Treatment and Results

Most patients were given an initial dose of 2 gm. of chloramphenicol, followed by 1 gm. in eight hours, and then 500 mg. six-hourly to a total of 9 gm. given in 3 or 4 days. This dosage is higher than that employed by Smadel's team (Smadel, Woodward, Ley and Lewthwaite, 1949; Smadel, 1950) in their original and highly successful trials of this drug against scrub typhus. They used 5-6 gm. given over 24 hours. Giles and Symington (1950) used an even smaller amount, namely 3 gm. as a single dose in 13 cases in Malaya and found it effective. Such an initial 3 gm. dose

followed by a similar dose a week later is, in fact, recommended by the War Office in the 1953 amendment of the Memoranda on Medical Disease in Tropical and Subtropical Areas. However, even on our relatively high and prolonged dosage, two cases (1 and 4) relapsed and needed further chloramphenicol. Four of the milder cases (7, 8, 9 and 12) were given only 3 gm. of chloramphenicol in two divided doses eight hours apart and did well, while Case 13 recovered completely without any chemotherapy. Apart from the two frank relapses, three further cases (3, 4 and 5) had to be readmitted to hospital for a further period of convalescence on account of general malaise and lassitude. These symptoms soon cleared with a further period of rest in hospital. All cases except Case 1 were followed up for three to six months after final discharge from hospital and suffered no serious sequelæ. In several cases the spleen remained palpable for four to six weeks.

Discussion

Though this series adds little to the known clinical picture of scrub typhus, it does prove the existence of Yudokuchi or foci of infection in Hong Kong, which has not previously been emphasized. Such foci, though localized, can remain a constant source of infection, for the rickettsia are passed on from one generation to another by transovarian spread. Hence small sporadic outbreaks, separated by years, can and do occur in Hong Kong. The variation in clinical features as described in different outbreaks has already been discussed (see Table II), and such variation can give rise to difficulty in diagnosis, especially in an area where the existence of the disease is not generally known. In the present series an initial diagnosis of malaria was made on the first few cases in view of their recent sojourn in a malarious area (New Territories), fever with rigors, and the finding of parasites in the blood; other features such as intense headache, splenomegaly and leucopenia suggested the possibility of typhoid fever. In milder cases the presence of generalized lymphadenopathy, splenomegaly and rash may lead to an initial diagnosis of glandular fever, as happened in Cases 11 and 12. This is especially likely in sporadic cases with only slight constitutional upset. Cases with hepatosplenomegaly with bile pigments and urobilinogen in the urine have to be differentiated from early infective hepatitis, though frank jaundice is rare in scrub typhus and did not occur in this series. The series also confirmed the observations of many workers that a rise in the Proteus OX K agglutination is not invariable in scrub typhus (Doherty, 1956).

Summary

A small outbreak of scrub typhus among British soldiers in Hong Kong is reported. Ten had been in the same area during a military exercise when presumably they were exposed to bites by larval trombiculid mites. Prominent clinical features were a maculopapular rash, splenomegaly and generalized lymphadenopathy. Eschars were found in three cases only. The white cell count was usually low, and the Weil-Felix reaction with *Proteus* OX K was positive in 8 out of 13 cases. The treatment and differential diagnosis are briefly discussed. A report of this small outbreak may serve to draw attention to the occurrence of scrub typhus in Hong Kong. Sporadic cases

undoubtedly occur too, and may have to be differentiated from other common conditions in young adults, such as glandular fever, malaria and enteric fever. The Weil-Felix reaction with Proteus OX K may be useful in such differentiation and is essential in any case of undiagnosed fever in this area.

We would like to thank Captains John Brooks and Barry Smith, R.A.M.C., who helped to look after the patients.

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PARIS IN THE SPRING ...

An excuse to visit Paris in the spring was provided for a select few by the Tenth Shape Medical Conference in May 1961. An imposing array of the highest brass from the medical services of the Nato countries was welcomed by General Norstad. Major-General Labarthe of the French Air Force in the chair announced the theme of the conference as Space Medicine, presented by the United States Air Force Medical Services.

The greater part of the first day was taken up by briefings by members of the Shape staff. Major-General Tarver, Assistant Chief of Staff, Intelligence Division, spoke on Soviet Capabilities, Major-General Jacquier, Assistant Chief of Staff, Plans and Policy Division, dealt with Nato Capabilities. After lunch, the first speaker was Lieutenant-General Lecomte, Deputy Chief of Staff, Logistics and Administration, who spoke on Current Logistics Planning. This concluded the general briefings, and the conference turned its attention to more specifically medical subjects. The Deputy Chief Medical Officer, Shape, Colonel R. A. Smart, reviewed the medical support capabilities of Allied Command Europe. This dealt with such subjects as casualty estimation, requirement and availability of hospital beds, levels of medical supply, and medical support of the Mobile Land Force. The floor was next taken by Lieutenant-Colonel Salou, Chief Medical Officer, Allied Forces Central Europe. He concentrated his remarks upon two subjects. First, he pointed out the very great variations in casualty estimates, as between one nation and another. Secondly, he made a plea for co-ordination between civil and military medical services, particularly at lower levels. The final presentation of the afternoon was given by Major J. A. Critchley, R.A.M.C., on Current Standardization Projects. He explained the organization and function of the Military Agency of Standardization and went on to review the work of the Army Medical Working Party. He briefly reviewed the important standardization agreements, and showed very clearly how difficult it was to reach agreement even on apparently simple matters. The agreement on which it has taken longest to reach accord was that on stretchers. However, the Army Medical Working Party has a very good record on agreements, and Major Critchley referred in particular to the Nato Table of Medical Equivalents. Major-General van der Giessen, Surgeon General Royal Netherlands Army and Air Force, in discussion, suggested that the Army Medical Working Party should drop the "Army" part of the title, if it is to be truly an interservice party.

The morning of the second day was devoted to the presentation on Space Medicine by the United States Air Force, introduced by their Surgeon-General, Major-General A. K. Niess. The first speaker, Lieutenant-Colonel David G. Simons, was the officer who exceeded all previous height records on balloon flight Manhigh II with almost 103,000 feet. He described his personal experiences on this flight, discussed the selection of biological specimens, and the development of a life cell (bio-pak!) through which environmental data were recorded and re-broadcast to ground stations through the rocket telemetry system. Colonel John E. Pickering spoke on the Biological Effects of Space Radiation and emphasized the present state of uncertainty about radiations in the vicinity of Earth. Doctor Lawrence E. Lamb on Cardio-Pulmonary

Studies for Astronauts described work on the adaptability of circulatory reflexes to types of stress similar to those which can be expected during flight. Lieutenant-Colonel Don E. Flinn spoke on Performance Data in the Space Cabin Simulator. The subject in the simulator is presented with tasks involving the functions of spacial discrimination, perceptual judgment, vigilance, and problem solving, with performance recorded electrically. Lieutenant-Colonel Hamilton H. Blackshear described current research at the U.S.A.F. Aeromedical Field Laboratory and spoke of the work of the Unusual Environments Section, which is involved in testing adaptability to unusual or extreme ærospace flight environments. The last speaker of the morning was Major Robert M. White, who piloted the X-15 aircraft. He described the pressure suit used in the flights, and the mobile physiological unit which supported the X-15 programme reactions, and went on to describe his own reactions when piloting the X-15 at over 2,000 miles an hour.

A demonstration at Villacoublay Airfield showed a concept for the provision of immediate and advanced surgical support for a small force. Personnel and equipment from the Field Training Centre, R.A.M.C., representing an advanced surgical unit, were flown from the United Kingdom to Villacoublay in Nord-Atlas aircraft of the German Air Force, and a C 119 of the Belgian Air Force. Equipment and personnel were moved from Villacoublay to a nearby airfield by a Beverley helicopter of the R.A.F., which carried the Universal Container underslung, and by a Vertol Piasechi, H 21, of the French Army, representing the move to the combat zone. Spectators saw the lift of personnel and equipment, the setting up of a Regimental Aid Post, and the establishment of the Advanced Surgical Unit, with the Operating Centre in the Universal Container, and with pre-operation and post-operation wards in the Annexes. The R.A.P. was set up on a long wheel base landrover with an experimental prototype shelter. A mock battle broke out in a nearby wood and French Air Force troops, made up by the Mytchett team with their usual realism, were brought to the R.A.P., treated, and removed to the Advanced Surgical Centre by Alouettes of the French Air Force. It was a remarkably smooth and successful demonstration. considering the different nationalities and services involved, and the fact that there was virtually no opportunity for rehearsal.

Group-Captain Jackson opened the proceedings on the third and last day of the conference with a presentation on The Artificial Kidney and its place in Traumatic Renal Failure. He described the portable artificial kidney unit which had been developed at Princess Mary's R.A.F. Hospital, Halton, and pointed out that, until Korea when an artificial kidney was used for the first time to treat battle casualties with renal failure, about 90 per cent of such patients died. In Korea Teschan and his colleagues reported a survival rate of 43 per cent in 51 patients treated with a rotating drum kidney. Studies on the acclimatization of troops to heat were described by Major J. M. Adam, R.A.M.C. The performance of artificially acclimatized men was superior to that of unacclimatized men under jungle conditions simulated in a climatic chamber. Acclimatization was, however, lost after 38 days in a temperate climate. Results obtained in the field from trials with a control platoon, an artificially acclimatized platoon, and a naturally acclimatized platoon, showed the need for a high standard of physical fitness and man-management. Major Adam demonstrated

some of the equipment used in field trials including a radio pill to record pressure changes, which he had swallowed before our eyes at the start of his lecture. When he did a belly dance, the pill produced some impressive squeals for the benefit of the conference. Similar pills will react to changes in pH and temperature, but the demonstration model was later reported lost somewhere on the French railway system. Lieutenant-General H. E. Knott, our Director-General, opened the discussion with a brief review of the changes in thought over a number of years in methods of protection from heat effects. Major-General J. H. McNinch, Surgeon, United States Army Europe, asked whether it was practicable to maintain a body of troops, perhaps a regiment or more, artificially acclimatized and ready at all times to move to a hot climate, to which Major Adam replied that this was on the agenda for the future.

The first speaker of the afternoon was Lieutenant-Colonel C. Y. R. Pedoya, French Army, Professor at the Val de Grace Military Hospital Medical School. He spoke on Nutritional Problems of Survival. He described the method adopted by the French Armed Forces for the storage of emergency supplies of water, namely 300 ml. of Evian water in anodized aluminium containers. This method might prove useful in stockpiling water for civilian or military use in case of disaster. The main subject of his speech was the evolution of a French nutritional survival unit. It has a total calorific value of 1,056 and has emerged successfully from trials in temperate climates, the Sahara (with restricted drinking water), and cold climates. The Sahara experiment was particularly ingenious in that the subjects were unaware that the emergency situation had been contrived by a planned forced-landing of their aircraft thus eliminating some psychological factors. Lieutenant-Colonel Pedoya stated his view that the minimum safety ration in that climate should be three litres a day per man. The final item was by Major F. W. Ahnefeld of the Army Medical Services of the German Federal Republic on the Initial Treatment of Burns in the event of Disaster. He advocated crystalloid solutions given orally to combat shock and a newly developed burn powder, containing an anti-histamine, a local anæsthetic, and an anti-bacterial agent. He also showed a new German burn dressing.

TALKING TURKEY

Lieutenant-Colonel D. L. SCOTT

On Corps Sunday, 1961, the Director-General and I in the company of an air vice-marshal and a surgeon captain set off by Comet from Heathrow for Ankara. Being the poor relation and the Treasury being what it is, I was in the rear compartment labelled Tourist while the others travelled first class. They were good enough to talk to me at Rome, Athens and Istanbul though, and it was on the whole a pleasant trip.

We were the British delegates at the First Cento Military Medical Congress, and we were soon picked up and whisked off to sign the Ambassador's book at the Embassy, and then on to the opening session of the conference. This was held at the Gulhane Military Medical Academy and was a pretty impressive affair with flags of all member nations, earphones for simultaneous translation of speeches, and all the usual paraphernalia of an international meeting—not forgetting the ubiquitous photographers. With due solemnity the meeting opened with a welcoming address in Turkish by the Turkish Surgeon-General followed by another talk from the Turkish Chief of Staff. After that a reception at about 11 a.m. at which whisky, brandy, coffee and a variety of very oriental looking eatables were produced. These were handed round by the Nursing Orderlies on the staff of the Academy, who, like all Turkish soldiers had shaven heads; and with their gowns and thick peasant hands they made rather incongruous waiters.

We then went into committee and since the proceedings of the committee were secret I can say little about them. There seems nothing secret about the first two items though, which were decisions on whether the meetings would take place in uniform or mufti and what the language of the conference would be. Personally I hoped for mufti because I was not confident that my one suit of khaki drill, borrowed from the Director of Medicine for the occasion would stand the strain for a week. But it was obvious that the Turkish Officer lived in his uniform, and as they were the hosts we bowed to their wishes. Since, however, English was the most generally spoken by all delegates, it was to be the lingua franca.

After lunch at our hotel, the Bulvar Palas (some palace!—with a unique plumbing system which inevitably failed to appeal to the Director-General's specialist training), we all forgathered at the Ataturk Mausoleum. An impressive ceremony was arranged here, at which delegates from all the member countries followed a gigantic wreath up the approach avenue, lined by alternate sentries from the three services and stone General Atasagun placed the wreath on Ataturk's tomb and we all went off to the Museum. It was interesting to see the many personal relics of this great founder of modern Turkey. How much he is revered is shouted at you from every shop and office, where his photograph or statuette confronts you. His car was in the museum, his personal toilet articles, presentation photographs from other rulers, the original of the new alphabet which he introduced in 1928, and a plus-four suit in a glass case with the label of a well known Paris tailor displayed. The Mausoleum itself is enormous. It is situated on a hill-top site in Ankara whither Ataturk moved the seat of government and the site is alleged to have been selected by him before he died because it was visible from nearly everywhere in Ankara. Constructed of stone brought from every province in Turkey, its square columns and vast courtyard and approaches are a fitting memorial to such a powerful and dominant character. Another visit in the afternoon to the Hittite Museum was of absorbing interest, especially as it was all explained by a very knowledgeable Turk who had done much of the archæological digging himself. The day was rounded off by a reception at the Ordu Evi, the Turkish Officers' Club, where after drinks and a typically Turkish supper we were entertained by a group of extremely wild looking but well drilled Turkish sword dancers.

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Tuesday was a day of conference with our Director-General in the chair and a hurried visit to the Ataturk Sanatorium, before lunch with the Military Attaché, and an American reception in the evening. This was followed by what was a unique experience for me. An American lady with a terrifyingly Texan twang invited me to dine at the United States Officers' Club. We went, a party of about eight, and it was Bingo night, which seemed a very earnest affair. All-American food in an all-American atmosphere was enlivened for me by my sitting next to Dr. Frank Berry, an elder statesman of unique charm and wisdom. On Wednesday I delivered myself of my oration and all day was spent in conference with a pleasant lunch break at the house of an air commodore. Opposite him the Russians were building a new embassy, because the old one was overlooked by a recently built skyscraper block of flats, and no Russian likes being overlooked. In the evening the Turkish Broadcasting Station invited us to a recital of Turkish folk music which was performed by highly competent instrumentalists and top-quality singers.

Thursday was an interesting day, for the whole conference travelled to Konya. Across the vast open spaces of the Anatolian Plain we travelled about 150 miles to this fascinating town, known as Iconium when St. Paul visited it. Through patches of semi-desert and other areas where mechanized farming was very much in evidence, our convoy finally arrived at the museum which houses the magnificent tomb of Jalal ad Din, the founder of the Mevlevi Dervishes. Among the many magnificent Seljuk relics were two Victorian grandfather clocks. This seemed odd, but turned out to be a feature of all the major mosques we visited. A pinguid lunch at the Konya Club and a visit to a military hospital filled the day before a rush back across the vast plain to Ankara to change before an American reception. As we got out of the car outside the hotel, General Gursel, the Turkish president, drove past and Michael, our driver, showed deep respect for him.

When the conference was over, the Turkish Air Force flew us all to Istanbul. Here the sightseeing was unsurpassed: the Blue Mosque and the fabulous treasure house of the Seraglio Palace being things I personally long to see again. Being officially conducted by the Turkish Army, we saw many things not normally open to the public, and there was still a vast amount unseen. In the evening our hosts left us at the luxury Chinar Hotel on the Marmora coast and they flew back to Ankara. As they drove away I felt particularly grateful to Colonels Fethi Tezok and Adnan Yeseren who had been especially kind to us throughout. On Sunday we lazed in the sun in the morning and then went into the city for lunch and some more sightseeing. The hotel tourist bus did the ten-mile journey for 25 lire each way. We walked five minutes to the local railway station and got a return ticket for $1\frac{1}{2}$ lire. And so ended my last overseas tour in the R.A.M.C. It was only eight days but they were packed and very interesting days. The final duty was the completion of my 1771 and to my delight I found the Paymaster was talking turkey too. He reckoned I had worked out the rate of exchange wrong, and stepped up my claim by £4.

STERILE SUPPLY

A most interesting symposium was held by the United Services' Section at the Royal Society of Medicine Meeting on 23rd March, 1961, and attended by a gratifyingly large audience.1 Lieutenant-Colonel J. M. Matheson, R.A.M.C., read an erudize and comprehensive paper tracing the origins of the Central Sterile Supply Service from the formation of a surgical dressing sterilizing unit in Cairo in 1942 supplying pre-sterilized dressings to field surgical units. The advantages of a central service and efficient control were given emphasis in the postwar years because of the increasing incidence of hospital sepsis as shown by the reports of the Nuffield Provincial Hospital Trust in 1957 and 1958 2,3 and by the Ministry of Health in 1959.4 Colonel Matheson pointed out that central sterile supply services have been established at most military hospitals at home and overseas for many years, but the one with the largest commitment was that of the Cambridge Military Hospital, Aldershot, which was established in 1955 as a unit for research and development in this field. It was not until 1960 that these services became an accepted feature of hospital planning.⁵ The service provides the sterile requirements of wards, theatres and medical centres. excluding theatre instruments and pharmaceuticals. It is under the Officer in Charge of Surgical Division and has a Warrant Officer Class II, who is a State Registered Nurse, as supervisor. There is a staff of ten persons, both R.A.M.C. and civilian. As far as possible, unit packs are designed to contain the number of dressings necessary for most procedures; most drums have been discarded and replaced by cardboard boxes which are easy to autoclave and replace. The responsibilities of each person. especially those who work the sterilizing apparatus, are clearly defined and supervised. and the hospital pathologist is the monitor of the sterilizing standards of the department. Colonel Matheson described the layout of the department in detail; he described the working of the syringe service and described the various types of packs used. illustrating most of them. He discussed the difficulties that had arisen and how they had been circumvented, and also pointed out that research and development are continuing. He described many of the methods which had been brought into use as a result of these developments, while detailing his views on the further developments that seemed probable. He stressed the value of disposable items in reducing the work load and the accounting problems, pointed out that increasing use is being made of gamma-ray sterilization, and hoped that in due course completely disposable packs may be prepared, sterilized and issued in bulk from a central source outside the hospital.

Colonel Matheson was followed by an interesting paper from Major J. M. Orford, Q.A.R.A.N.C., on The Nurse and the Central Sterile Supply Service. She pointed out how the ready supply of sterile materials had meant much saving in time and drudgery for the nurse, who no longer has to devote time to sterilizing the equipment

¹ Proc. rov. Soc. Med. (1961). 54, 757-763.

Nuffield Provincial Hospitals Trust (1957). The Planning and Organization of Central Syringe Services. London.

⁵ Darmady, E. M., Hughes, K. E. A., Tuke, W. and Verdon, P. (1960). *The Hospital*, Oct. p. 1.

or to sterile procedures, and pointed out how the system has eliminated the temptation to take dangerous short cuts in these manœuvres; sisters thus have more time for individual bedside care and active nurse training. She named two other benefits of the system as being the better state of maintenance through regular cleaning and inspection before issue, and that there is less tendency to hoard apparatus against emergencies in the ward. She described how difficulties and misunderstandings occurred during the development of this system, and how these were overcome by better understanding and co-operation. She stressed the importance of acquainting student nurses with the obsolete methods of ward sterilization which may still be required in an emergency, and also of the value of student nurses in the Army Preliminary Training School visiting the service in order to understand fully its various activities. She also dwelt on the importance of using disposable items as much as possible, especially such items as catheters. She described amusingly the awkward period when the service was in use in the hospital, but for nursing examinations the ward sterilization procedures had to be taught, giving the student nurse the impression that there were two distinct ways of preparing for the same procedures, one peculiar to the Army and the other peculiar to examinations and civilian hospitals. The situation has now fortunately been relieved, first by the knowledge that Examining Bodies will accept layouts using the sterile packs as well as unpacked apparatus, and secondly that the large comprehensive packs are now broken down into smaller packets with their contents more clearly described.

The third paper was given by Warrant Officer S. R. Collantine, R.A.M.C., the supervisor of the Cambridge Hospital service. He described the distribution circuits. There is one internal circuit for the Cambridge and Louis Margaret hospitals, where trolleys are taken by the service staff, for a ward syringe service with five deliveries daily, and a twice-daily delivery of packs. Exchanges are made on a one to one basis at the ward, and in all some 200 syringes and 180 packs are exchanged daily, in addition to maintaining the obstetric flying squad packs at the Louis Margaret Maternity Hospital. Within a 25-mile radius of the Cambridge Military Hospital, medical centres, camp hospitals, and family hospitals are supplied with packs twice weekly by a truck on a milk-round system, and exchanges made. Some 200 syringes and a variable number of packs are exchanged on each round, and additional syringes and needles are delivered for mass immunological procedures. The Connaught Hospital, about 15 miles from Aldershot, has its own vehicle which collects packs from the Cambridge twice weekly, and this also supplies family hospital centres in Bordon and Longmoor. Finally he described the distribution of sterile supplies to hospitals in the London area, a more complicated process as the packs must be packed after wrapping in polythene sheeting to keep them dustproof, and sent by rail each day to Waterloo. Here they are collected by a vehicle from Woolwich, which distributes the consignment to the Queen Alexandra Military Hospital, Millbank, and the Royal Herbert Hospital, Woolwich. He described the arrangements made for supplying troop ships with their requirements for voyages of up to two months, and the arrangements for overseas emergency demands due to active service. He stressed the importance of adequate stocks, sound packaging and the well-maintained distribution table, and also emphasized the advantages of using disposable items wherever possible.

Finally, Lieutenant-General Sir Alexander Drummond, to whose drive and energy the successful conclusion of this project is largely due, spoke briefly of the projected new organization centred on the Army Medical Equipment Depot at Ludgershall which would produce disposable packs in bulk for worldwide use. Hospitals and medical units are still responsible for sterilizing their own theatre instruments, and until disposable items are introduced, syringes, linen gowns and sheets will be sterilized at the Central Sterile Supply Service for a number of hospitals as described above. He pointed out that gamma-ray sterilization is already taking place at a capacity of 200 cubic feet per week, and this will increase to 250 cubic feet per day at the end of the year.

The symposium was extremely well received and it was felt especially valuable that the nursing and technician side had been competently represented to an audience largely consisting of doctors.

J.C.W.

MUSEUM NOTES

THE R.A.M.C. Museum at Crookham is always a great attraction to members of the Corps, and to parties visiting the Depot and Training Establishment. It is one of the most famous army museums in the country, and in future editions of the *Journal*, we hope to supply information on some of the interesting new items which may be seen there.

The latest prize acquisition has been presented by Miss Kathleen Monro, and is a piece of the original penicillin mould presented to the late Major-General D. C. Monro by Sir Alexander Fleming. Members of the Headquarter Officers' Mess have loaned a writing desk, once used by Queen Victoria, from the House of Lords, and the walking stick of Surgeon-Major Cornish who was killed in action during the Boer War. Cattell, in his unpublished memoirs, describes how Cornish met a "gallant death" collecting wounded at Majuba. Apparently he was coming round a hillside with a wounded man when to ease the load, he slung the soldier's rifle across his shoulder. Boer soldiers, coming from the opposite side of the hill thought Cornish had come out to trap them. He waved a white handkerchief and shouted "wounded man," but probably not in Dutch. The Boers, not realizing he was a doctor fired on him, and Cornish died from his injuries later the same night. Shortly afterwards the Boers sent an apologetic message to the English regretting their action and the incident is recorded in a memorial window at All Saints Church, Aldershot, The walking stick, which was presented to the Corps by Cornish's father, was originally in the museum at Netley.

The collection of relics associated with Florence Nightingale is fast building up, and the latest addition is the passport of Florence Nightingale's party of 30 nurses travelling to Constantinople, which has been presented by the Rev. J. Compton Bracebridge. Another item associated with the Crimean War has been given by Mrs. Lilian Nott and is the sword worn by her famous grandfather, Doctor Maund during that war. The manuscripts of the Greig Crimean Diaries, transcriptions of which are already in the muniment room at the Royal Army Medical College, Millbank, have been presented by Miss Ann Keiller Greig. Included with them are several documents of exceptional interest including a letter from Doctor James Simpson to three young doctors urging them to introduce chloroform, and David Greig's posting order signed by Sir Andrew Smith.

Sporting enthusiasts from all ranks will be interested to know that the Museum now houses a collection of Rugby Football caps and souvenirs from the 1914/18 war presented by Major-General J. C. A. Dowse, and from Major-General F. Casement has come the Irish International Cap he was awarded in 1906.

Finally, the museum now possesses the sword of Egerton Hale, V.C.; a plaque of the Royal Jordanian Medical Services, and a large collection of new medals.

P.J.C.

LETTERS TO THE EDITOR

PROMOTION FROM THE RANKS

From Staff Sergeant D. D. Clements, R.A.M.C.

Sir.

I refer to the War Office comments on other-rank career and Commission prospects with W.O.II Miles's letter in the April Journal (p. 123). I feel it should be made quite clear that the Short Service Combatant Commissions referred to do not apply to the R.A.M.C. The Short Service Combatant Commission, which applies in most other branches of the Army, makes provision for the selection of promising young and qualified N.C.Os. who are trained to become good adaptable officers and who will mature into sound field officer material.

There is also the alternative of a quartermaster commission, for which lengthy experience in the ranks is required, rising to substantive Warrant Officer Class I and II. In the R.A.M.C. the *only* opportunity a soldier has of obtaining a Commission is it this second way. R.A.M.C. soldiers with less than 12 years' service *may* apply for a Short Service Commission—but only at the obvious expense of leaving the Corps.

H.Q. MIDDLE EAST COMMAND, BRITISH FORCES POST OFFICE 69. 6th June, 1961.

I am, etc.,

D. D. CLEMENTS.

RECRUITING TECHNICIANS TO THE MODERN ARMY

From Corporal J. Chalk, R.A.M.C.

Sir,

Recent figures indicate that the technical strength of the R.A.M.C. will be lower than required for the all-regular Army. At present Army laboratories are staffed by a large number of National Servicemen and very few of these are taking regular engagements despite the offer of £200. This is, I feel, because men with a vocation cannot be bought and will only be encouraged to sign on by a change of conditions.

National Servicemen fail to sign on for four main reasons. First the technician lacks status in the Army. As an N.C.O. he is treated no differently from any other N.C.O. of equal rank who may be engaged upon general duties. This seems to be a form of democracy in which the lowest common denominator has to do for everyone. Secondly, the soldier seems to be a social outcast. The man in the street regards all soldiers as inferior beings whose only interests are ribaldry and excess. There is also a common fear that the soldier or ex-soldier will assume an artificial superiority derived from rank. As a direct consequence the National Serviceman considering a regular engagement might be afraid of what six or nine years in the Army might do to his character or to other people's regard for him.

Thirdly, a married man is concerned to maintain a happy and stable home for his family. Postings sometimes make this difficult even when six months' notice is given. He cannot guarantee to give his children an unbroken secondary education Deparation is a bad thing and consequences can be seen today of fatherless homes during World War II. The possibility of postings making education difficult for the soldier himself is also very real. Army education standards are not high enough for the ambitious technician who wishes to obtain knowledge and qualifications in advance of the Army Certificate of Education Class 1. The argument that the Army provides cheap correspondence courses is not a valid one, for most of the subjects studied by technicians involve practical work which must be done in suitably equipped laboratories at evening classes. The Army, though willing to pay for the soldier to attend such classes, reserves the right to post him at any time during the course. Every facility should be given to the technician to study for technical and academic qualifications.

Fourthly, most technicians have no desire to be involved in regimental duties or administration, because they take so much valuable time which should be devoted to the skills for which the technician is paid. The answer surely is that if the modern Army wants good technicians it must change its outlook and find its administrators from non-technical sources or from those less devoted technicians who are willing to give up their technical careers in favour of administration, and provide good career prospects for dedicated technicians.

ROYAL ARMY MEDICAL COLLEGE, MILLBANK. 31st July, 1961. I am, etc.

JOHN CHALK.

MISS NIGHTINGALE TODAY

From the late Mr. W. J. Bishop, F.L.A.

Sir.

Lieutenant-Colonel Hamilton's letter in the July Journal (p. 177) is indeed timely, and having been engaged for six years in an intensive study of Miss Nightingale's life and work, I should like to endorse almost every word of it. I think too much can be made of what the biographers have said about the extent to which girls were named after the "Heroine of the Crimea." It is perfectly true that the name Florence was a fairly common one long before Miss Nightingale's time, but it is equally true that it enjoyed a quite extraordinary vogue in the years following the Crimean War. What is much more important is that the popular legend of Florence Nightingale is being perpetuated, while her own writings are neglected, and her most important achievements forgotten. There is little understanding of her real message for today.

Florence Nightingale's ideas and achievements in the fields of public health and hygiene, hospital construction and management, medical statistics, and Indian and Colonial health and welfare, have far wider implications than her work for nursing. The very success of the Nightingale revolution in nursing has imposed certain limitations on the further progress of that art—a paradoxical situation, but one that finds a parallel in the case of many other great pioneers. The evidence for this view of Miss Nightingale will be found in the 200 books, pamphlets and articles which she published



and in the 12,000 or more letters which she wrote and which are extant. For true estimates of her work and its influence reference should be made to the recorded opinions of those who were most closely associated with her—men like Sir John McNeill, Thomas Alexander, Sir James Paget, William Farr, John Sutherland, Sir Douglas Galton, Sir Henry Acland and Sir Robert Rawlinson. Most of these men were concerned with only one of her spheres of activity, but within that sphere they recognized that she was a vitalizing and inspiring force without parallel.

It is indeed high time that the leaders of the nursing profession (and, one might add, of the medical profession) read some of Miss Nightingale's own writings rather than the biographers. They might well begin with the paper which she contributed to the nursing section of the famous World's Fair held in Chicago in 1893. In this she wrote that the sick person must be treated rather than the disease, that prevention is infinitely better than cure, that universal hospitalization will not give positive health, and that nursing must hold to its ideals but must change some of its methods. "Don't let us stereotype mediocrity," she wrote, "We are still on the threshold of nursing." Her writings are full of anticipations of the most recent pronouncements of sociologists and psychosomatic experts. And with all this she never believed in the germ theory, and she was a merciless slave-driver and a neurotic!

The researches to which I refer and which have been carried out with the support of the International Council of Nurses and the Florence Nightingale International Foundation, will result in the publication of the first complete bibliography of Florence Nightingale, together with a calendar of her extant letters. It is hoped that this publication will help those who wish to make a first-hand study of the life and work of Florence Nightingale. It was her friend Benjamin Jowett who wrote of Miss Nightingale that she had become a legend in her lifetime. She remains a "legend"—but for all the wrong reasons.

1 QUEEN ANNE STREET, LONDON, W.1. 30th June, 1961

I am, etc., W. J. BISHOP.

THE RIGHT APPROACH?

From Lieutenant-Colonel R. G. MacFarlane, M.B.E., M.D., M.R.C.P.(Edin.), R.A.M.C. Sir,

The new cover of the *Journal* is a great improvement on the old; but what is more important is the vastly different tone of your editorial, which at last, I feel, stimulates discussion on matters vital to the R.A.M.C. This is something which has been lacking. In a Corps like ours, scattered throughout the world, we never meet many of our colleagues. There is too little contact, too many oases with too little communication between them. Could we not improve the Corps by having more points of meeting, by airing our views, by discussing our ideas? Of course we do have many such points—clinical meetings, study periods, conferences, and not least, by contributing to and reading the *Journal* and the *Army Medical Services Magazine*. But are these enough? I am a Medical Specialist; I can recall only one gathering of Army Medical Specialists;

it was at this that I met, for the first time, six of my fellow physicians! Should there not be, not only more frequent meetings of the various specialists, but more frequent general meetings to discuss things which concern us all—things clinical, administrative, social and how best to serve our country and the Army in peace and in war? Can we make our Corps more dynamic and better fitted to serve its ends?

Of course we want to attract the idealistic young doctors of your editorial *The Right Approach* (July 1961, p. 127), those who are keen to devote "most of their waking hours to medicine and surgery." But are they the only ones we want to attract? Most doctors choose a general practice; relatively few reach the heights, or depths, of the consultant or the administrative fields of medicine. This sort of choice must surely apply also to doctors of the Armed Services, in which there is a wide range of medical activity—general practice, public health, hospital practice, administrative appointments and so on: and I am not sure that so few would relish the military responsibilities of executive rank as you suggest.

How can we make our Corps more attractive? Can we do this by making every man-jack feel that the R.A.M.C. is an organization second to none, which gives a satisfying life, a life full of interest and promise? Are the junior members of our Corps neglected; could they not be brought into more meetings and gatherings which only the more senior now attend; should their voice be heard? And if it is to be heard, would the listening give to the younger men a greater feeling of participation in the life and work of the Corps?

Not only young men are restless, ambitious. The leaders of the world are often restless and ambitious. Your comments on promotion in the R.A.M.C. are interesting, but is your plea for accelerated promotion confined to the "consultants"—the outstandingly capable doctors? We need too the outstandingly capable leaders, administrators, the outstandingly capable, restless and ambitious men, who may often also be outstanding and capable doctors. Should such men have to wait for promotion to catch up with them before their talents are fully utilized? If not, the healthy edge of competition might be sharpened, and the best men might get the top jobs earlier than they do. This already happens in civil life and to a lesser extent in the combatant arms of the Services. Would it be wrong, or impossible, to operate such promotion in the R.A.M.C.?

If money is not the right approach, what is? Would the establishment of a corps d'élite, a band of ambitious, restless men, eager to serve their country, eager to work together, but at the same time mindful of the challenge of competition, be a better approach? If so, can the idea be accepted, can it be put into practice, can it be demonstrated to work and, most important, can it be put over to those whom we want to attract? I think it can, but only if the lead is given and the challenge accepted by all members of the Corps.

CONNAUGHT HOSPITAL, HINDHEAD, SURREY. 20th July, 1961.

Yours faithfully, R. G. MACFARLANE.



ACADEMIC ACHIEVEMENTS

Brigadier L. R. S. MacFARLANE, O.B.E., D.P.H., director of pathology, War Office, was awarded the Mitchiner medal for 1961 by the Council of the Royal College of Surgeons of England at their meeting on July 13.

The Fellowship of the Royal Society of Health has been conferred upon Colonel J. L. GORDON, O.B.E., D.P.H., professor of army health, Royal Army Medical College, Millbank.

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MEDICAL MASTERS

Another landmark in postgraduate training has been set up by the R.A.M.C. The Mastership of Science of London University is no longer restricted to B.Sc. graduates. Despite prolonged controversy and opposition from scientists, a medical Vice-Chancellor ensured the establishment of a two-year course in radiation biology and physics. Six of our medical officers, far too close to 40 to find study easy, especially extra to their jobs, are struggling manfully through the gruelling course. Half way comes a primary examination, which they sat this summer. They did so well as to confound the sceptics utterly. The scientists exclaimed that they never expected such good papers from doctors. A professor of physics has said that he is afraid the standard has been set too high for the future. These officers working against every disadvantage have justified a bold experiment and have quietly added to the great academic traditions of our Corps. We most heartily congratulate them.



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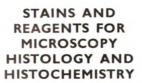
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BOOK REVIEWS

Memorandum on Immunological Procedures which Service Personnel and their Families may need at Home and Abroad W.O. Code No. 13161; Prepared under the Direction of the Director General, Army Medical Services; London: H.M.S.O. 1961. Pp. 79. 4s. 6d.

All medical officers in the Services, and civilian doctors as well, will be grateful to successive Directors of Pathology at the War Office (notably Major Generals A. Sachs and G. T. L. Archer) for compiling and editing so much essential information about immunization procedures. Three editions of this 80-page booklet in nine years attest its usefulness. Advances in this field are now so numerous that even more frequent revisions are likely to be required. The Army has always been in the forefront of immunization against the enteric fevers and tetanus, and it is interesting to note that "TAB Intradermal" and "TABT Intradermal" Vaccines are now advised for primary courses as well as for reinforcing doses. The chief advantage of the intradermal route is the relative mildness of reactions—a most valuable advance. On the technical side the sections on The Care, Maintenance and Sterilization of Syringes, Mass Immunization Procedure, and Injection Technique are particularly good, and should be studied carefully. Outstanding, too, are the tables on such matters as suggested immunization programmes for children of various ages and for adults, a scheme for rapid (urgent) immunization of travellers, and the storage and life (duration of effective potency) of all kinds of biological products. Unfortunately, the immunization schedules, P and Q, recommended by the Ministry of Health, were published only in September 1961—too late for inclusion in this booklet, a very few sections of which are somewhat out-of-step. Poliomyelitis vaccination (Salk versus Sabin) is likely to remain a controversial topic for some time, and the argument will eventually entail some further modifications of policy. 4s. 6d. is a modest price to have to pay for a pocket guide that contains so much in so accessible a form. H. J. Parish

Good English for Medical Writers. FFRANGCON ROBERTS. William Heinemann (Medical Books) Ltd. London: 1960. Pp. 179. 17s. 6d.

Medicine is still supposed to be one of the learned professions, but although coherent expression is increasingly vital to our patients, we no longer write clearly or well. Stenography, the typewriter and the dictaphone should have diminished the physical burden of writing that falls to a doctor's hand, but it is of course the mental training we bring to it and a determination always to avoid the use of words purely to impress that could still save us. Everyone should be able to afford to buy this book. It should help even a practised writer, and even if you do not agree with every stricture or edict, it will stimulate and encourage you towards higher standards.

Brompton Hospital Reports, Vol. XXIX. London: Lloyd-Luke Ltd. 1960. Pp. 261. 15s.

This volume is particularly worth reading, if only for the excellent articles by Mr. N. R. Barrett on hiatus hernia, benign stricture of the lower osophagus and the early management of the stove-inchest. Much valuable information is also available in authoritative articles on lung cancer, its treatment and follow-up. Other articles of special value are on the prolonged chemotherapy of pulmonary tuberculosis in adults the surgical treatment of pulmonary tuberculosis in childhood, chronic diffuse interstitial fibrosis of the lungs, as well as on lung function, chronic bronchitis, and the surgery of heart disease, congenital and acquired. J. MACKAY-DICK

Home Treatment in Injury and Osteoarthritis. W. E. TUCKER. Edinburgh and London: E. & S. Livingstone Ltd. 1961. Pp. 80. Illustrated. 10s. 6d.

This book will be found of value in bringing home to patients the prime necessity of practising exercises and other simple physical treatment regularly each day at home and not merely during short and infrequent sessions in physiotherapy departments. It helps further in giving them understanding of the necessity for and the underlying rationale of such treatment in some commonplace conditions. It is also useful in making available for the doctor a simple means of prescribing certain physical treatment. J. M. CARNOW

Traumatic Aphasia. W. RITCHIE RUSSELL and M. L. E. ESPIR. Oxford University Press: 1961. Pp. 177. Illustrated. 38s.

This elegant book is up to the highest standards of these publishers, and as the first of the series, augurs very well for the Oxford Neurological Monographs which Doctor Russell is to edit. It carefully analyses all aspects of the speech function and the even more fascinating subject of handedness in the large number of patients who were so well observed and written up in the Military Hospital for Head Injuries in Oxford during the last war. We hope that the achievements of this unique establishment will be commemorated before long in this Journal. D. G. SARGANT

A Guide to Human Parasitology. BLACKLOCK and SOUTHWELL (Seventh Edition) revised by T. H. Davey. London: H. K. Lewis & Co. Ltd. 1961. Pp. 223. Illustrated. 30s.

This new edition is an up-to-date version of a well known and much liked text; as a result of some pruning it contains new material without increase in size. It is a concise, clear and accurate guide to parasitology and is invaluable to both under-graduate and graduate medical practitioners. There are few books which give so much good value for money.

J. GATT The Evolution of Medical Practice in Britain. Edited by F. N. L. POYNTER. London: Pitman. 1961. Pp. 168. 25s.

This attractive book records the First British Congress on the History of Medicine, and the theme is sufficiently off the usual track to be very interesting. To say that the influence of various factors on practice, such as legislation, medical education, the royal colleges, the Scottish schools, rural conditions, medical societies, health insurance schemes, clinical research and the pharmaceutical industry, are each carefully outlined, is to suggest a dull work, which this is far from being. It is fascinating, readable, workmanlike, and well worth anyone's while to buy.

D. G. SARGANT

The Role of Immunization in Communicable Disease Control. W.H.O. Public Health Paper No. 8: 1961. Pp. 118. Available from H.M.S.O. 6s. 8d.

This short pamphlet gives a comprehensive account of immunization procedures in world-wide public health practice. In so far as it is world-wide in its approach it is useful for reference, but some of the recommendations are contrary to current Army vaccination policy. A useful comparison between live and killed poliomyelitis vaccines is included. With reference to tetanus it is stated that the extensively injured patient previously protected with tetanus toxoid should be treated with a booster dose of tetanus toxoid and with antitoxin. Experience in the last war would disprove the need for antitoxin under such circumstances. One chapter, of philosophical rather than practical value, has been devoted to the question of voluntary as opposed to compulsory immunization.

D. F. Conway

Techniques in Tropical Pathology. B. G. Maegraith, W. E. Kershaw and D. Dagnall. Oliver & Boyd Ltd., Edinburgh: 1961. Pp. 164. Illust. 25s.

Both Professor Maegraith and Professor Kershaw have consistently taught that Tropical Medicine is a branch of General Medicine. Tropical Medicine is medicine in the tropics. With this aim in view these authors have produced a book for use in investigating diseases in under-developed countries, suitable for both medical practitioners and laboratory technicians. They have succeeded in producing a concise book which will appeal not only to the public for which it was intended, but also to junior pathologists, registrars, and every aspirant to higher qualifications in this country. It is a well-planned collection of useful techniques, and I was pleased to note that due emphasis has been given to the time-honoured and more reliable methods for detecting abnormal constituents in body fluids. I do feel, however, that in spite of their limitations, there is scope for the Clinitest type of technique in the tropics, and I would have thought that the ortho-tolidine test for hæmoglobin/peroxidases would be preferable to the benzidine and guaiac tests. The former compound is now classified as carcinogenic, and the latter test is insufficiently sensitive. The publishers have achieved a high standard of production both of text and of colour plates.

J. GATT

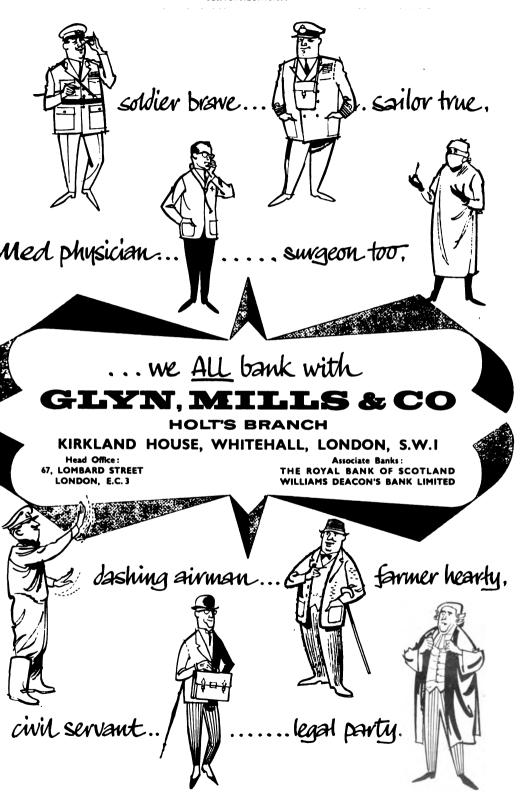
Scientific Aspects of Neurology. Edited by HUGH GARLAND. E. & S. Livingstone Ltd. Edinburgh and London: 1961. Pp. 264. Illust. 50s.

This book comprises most of a series of postgraduate lectures given in Leeds during the winter of 1959-60. Some few chapters, such as Professor Whitteridge's on the calcarine cortex and Professor Cumings' on cerebral lipidoses, relate recent developments and ideas in a highly specialized field. Others cover wider interests. Cerebrovascular disorders merit three chapters: syndromes of basilar insufficiency are fully considered by Dr. Denis Williams, Dr. Bull writes practically upon the scope of radiology in acute strokes, with well-produced plates, and Mr. Wylie McKissock reports the results of a clinical trial favouring a surgical approach in the treatment of ruptured aneurysms of or near the posterior communicating artery. Disseminated sclerosis is widely discussed in its pathology and pathogenesis by Professor C. E. Lumsden and Dr. Henry Miller, from somewhat differing aspects, and certain diagnostic difficulties are strikingly illustrated from clinical histories by Professor L. van Bogaert. Sir Francis Walshe surveys in typically clear style the origin of the pyramidal tract. Dr. Macdonald Critchley reviews Broca's contribution to aphasia. Mr. Pennybacker treats of trigeminal neuralgia comprehensively and forthrightly, and Sir Charles Symonds describes facilitation or arrest of epileptic seizures. All contributions are instructive, pleasant to read and accompanied by full references, and the illustrations are up to the high standard of this publisher. The Editor's hope that the views expressed will show, especially to the non-neurological world, the way neurologists are thinking in the mid-20th century is a valid one, but it is a pity that he did not add his own views. T. P. H. MCKELVEY

Control of Soil-Transmitted Helminths. Paul C. Beaver, W.H.O.: 1961. Pp. 44. Available from H.M.S.O. 3s. 6d.

This paper deals with the roundworm, the whipworm and the hookworm, with a section on miscellaneous helminths. Although of all the worms parasitic in man the soil-transmitted nematodes have most effect on individual health and group productivity, control methods have so far been relatively disappointing, presumably because there is no practical way to interrupt the exogenous part of the life cycle and no really effective anti-helmintic. Professor Beaver considers that the most promising approach to control of transmission is an ecological one. An annex deals with diagnostic methods including the reliability of egg counts. I commend this paper to anyone interested in the control and diagnosis of helminth infection.

W. O'CARROLL FITZ PATRICK



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rthropod-Borne Viruses. W.H.O. Technical Report No. 219. 1961. Pp. 68. 5s.

This is an excellent and up-to-date survey of the subject, which will be of value to epidemiologists, ntomologists and planning staffs as well as to virologists. Twelve annexes convey a wealth of chnical information, including a new list of viruses classified in the antigenic groups of Casals, and bibliography. The knowledge of this subject which has become available in recent years is not llowed to mask the problems awaiting solution, and helpful suggestions are made for further research nd exchange of information. R. J. C. HART.

tandardization of Methods for Conducting Microbic Sensitivity Tests. W.H.O. Technical Report No.

 10. 1961. Available from H.M. Stationery Office. Pp. 24. 1s. 9d.
 This admirable report should be read by all pathologists responsible for carrying out sensitivity ests and by all clinicians who request them. It is an authoritative survey of the principles involved nd discusses most of the techniques used. It is perhaps inevitable that a committee cannot give technical instructions, though these would add greatly to the value of the report.

R. J. C. HART

The Delayed Effects of Whole-Body Radiation. A symposium edited by Bernard B. Watson. Johns lopkins Press for the Operations Research Office and the Walter Reed Army Institute of Research, J.S.A. 1960. Pp. 80. 36s.

It is encouraging to see some signs of interest in the long-term effects of radiation being shown by an organization like the Operations Research Office who are primarily concerned with the military uses of nuclear energy. This symposium, the published report of a meeting held to study these longterm effects, is a collection of seven papers on aspects of the problem such as the effect of radiation on life-span, on the causation of malignancy on the production of cataracts and on genetic effects. The first section, dealing with the reduction in life-span to be expected following radiation, is largely a mathematical treatment of the subject, clearly showing its complexity and concerned with extrapolation from animal experiments to man. The other sections deal with experimental work on animals and summarize the small amount of human data available. It is strange that there is no discussion on the long-term effects of radiation on fertility, which may be the critical effect from the point of view of national survival, and the whole question of ingestion of radioactive materials such as fallout also receives no attention. As far as it goes, the report is, however, interesting to the specialist.

J. A. H. Brown

The Extra Pharmacopeia, Supplement, 1961 Martindale. The Pharmaceutical Press, London: 1961. Pp. 315, 32s. 6d.

The Extra Pharmacopæia has grown remorselessly from the 313 pages of 1883. Since the 15th edition in 1912 it has been published in two volumes, and for some years it has been the practice to revise one volume at a time every two or three years. Volume II of the 23rd edition came out in 1952, and Volume I of the 24th in 1958. Over 1,000 new drugs and proprietary medicines have been produced since 1958, and this supplement is a more useful attempt to cope with the situation than a revision of Volume II. Martindale now consists of 1,695 pages of Volume I (24th edition), 1,501 pages of Volume II (23rd edition), and 315 pages of supplement, and costs seven guineas for the three. Of this massive compendium of pharmacopæia, food analysis, sterilization, spas, proprietary medicines, clinical biochemistry, culture media, and a clinical and bacteriological section of over 100 pages mainly of tropical medicine, most of what is useful to the doctor is in this supplement. Gardeners will be interested to learn that bone meal fertilizer is an important source of anthrax. There are accounts of influenzal antigenic variation, brucella cultivation, poliomyelitis vaccine, rabies vaccine, and yellow fever vaccination by scarification. The section on sterilization of drugs and equipment is up-to-the-minute, detailed, and excellent. An article on blood transfusion includes accounts of A-subgroup ethnology (100 per cent of South American Indians are Group O), blood-group chimæras, anticoagulation in heart-lung machines, liquid nitrogen methods of freezing, and citrate toxicity. The proprietary medicines are "counter" and "ethical." Examples of the "ethical" are Stelabid, Brevidil, Thiotepa, Thioridazine, with their pharmacopæial, chemical and proprietary names and dosage. The section on counter proprietaries gives the formulæ and manufacturers of (to name only a few) Aletricor Aletris Cordial. Alpine Tea, Atkinson and Barker's Infants Preservative, Bates and Co.'s Compound Breast Salve, Beecham's Pills, Burgess' "Lion" Pills, Bowden's Indian Balm, Cabdriver's Junior Glucose Linctus, Falconer's Golden Compound, Dr. Frank's Skin Ointment, Grasshopper Ointment (made by Grasshopper Ltd. of London), Himrod's Remedy, Happy Journey Tablets, Union Jack Paste and Zom Pile Tablets. There may be some gold somewhere in those galenicals, but whether there is or not, this supplement is invaluable to the practising doctor.

D. HAMILTON

A Guide to Cardiology. J. C. LEONARD AND E. G. GALEA. E. & S. Livingstone Ltd., Edinburgh & London: 1961. Pp. 267. Illust. 27s. 6d.

Here is a clear and concise account of modern British teaching in cardiology. There has been much progress in this subject since the war, spurred on by the need of the surgeon for greater precision in diagnosis. Cardiac catheterization, angiocardiography and other physiological techniques have aided this, but perhaps more important to the general practitioner, they have added much to the knowledge of the physical signs readily elicited at the bedside. Careful examination of the jugular pulse, assessment of the heart sounds, the more critical definition of murmurs, and the recognition other abnormal sounds, should now be common to the general physician and the cardiologist. It book avoids controversy and gives an excellent account of clinical cardiology for any postgradule student.

Teaching of Psychiatry and Mental Health. Various Authors. Public Health Papers No. 9. Wer

Health Organization. Obtainable from H.M. Stationery Office. Pp. 186. 10s.

If you accept the proposition, for which there is adequate evidence, that at the present rate increase of mental disorder a point will soon be reached where society will be unable to cope with number of psychiatric patients asking for treatment, you will find this symposium to be of the was value and significance. Despite the traditional scepticism of the staffs of medical faculties and resistance of medical students, generally most marked in their second year of clinical training, was propagation of psychiatric principles, there is an urgent and growing need for the more widespect and efficient teaching of psychological medicine. This stimulating book, which contains little criticize, and much to commend it, covers many aspects of the teaching of psychiatry and its integration in the commend it, covers many aspects of the teaching of psychiatry and its integration in the commend it, covers many aspects of the teaching of psychiatry and its integration in the commend it. tion into the framework of total medicine. The divers nationalities of the contributors are interesting reflected in their varying emphases on social and cultural factors. There is plenty to provoke thous in this book, and the specialist in any branch of medicine who after reading it is unable to broke his horizons or gain a little wisdom is undoubtedly in the wrong profession. H. POZNI

Medicine in Tropical Africa, M. GELFAND, E. & S. Livingstone Ltd., Edinburgh & London: 14

Pp. 243. Illust. 30s.

The problem of combining the best technical training in medicine with an adequate knowledge the African patient and his environment has always been difficult. Under the colonial regime media officers graduated through long years of outstation work before reaching the main hospitals. The knowledge of the people and country was deep. Now there is a tendency for specialists trained in country to serve a limited time under contract, and perforce these men know little of the racial and environmental conditions which do so much to shape the character of African medicine. Dr. Gelian gives the best account of the sick African that I know, and this book should be read by all seeking. practice in this continent. The latter part of the book is less satisfactory. The author has the laudable object of widening the scope of tropical medicine beyond the limiting barriers of parasitology. treatment of many subjects is sketchy, and much is too partial a review of the literature. Africa B1 very large place, and the people with their disease patterns vary greatly in different parts. This box would have been better if it were confined to Rhodesian medicine, on which the author is acknowledged authority.

Clinical Hæmatology. R. D. EASTHAM. Bristol, John Wright & Sons, Ltd.: 1961. Pp. 158. In This synopsis contains a lot of hæmatological data in note form, and with the index it should provide ready reference for both clinician and pathologist. I do not, however, understand how a factual book of this nature will fulfil the author's hope of encouraging "... more discussion of hæmatological cases and problems between clinicians and hæmatologists." There are a few errors e.g. blind or stagnant intestinal loop is given as a cause of folic acid deficiency, but my main critics: is the gross inconsistency in classification and terminology. For example in a list of causes of anemal associated with malignant conditions, "shortening of red cell life-span" is listed separately from hæmolysis due to auto-immune antibody "which is confusing, because hæmolysis is defined as shortening of red cell life-span. Again in a list of causes of decrease in erythrocyte mean cell diameter. chronic hæmorrhage is listed as well as hypochromic microcytic anæmia, while in fact chronic he morrhage is a cause of this anæmia. I dislike lists of causes, and in this book they are made unnecessity sarily long by using sub-divisions of diseases instead of broad categories. In the list of causes of leuco-erythroblastic anæmia, acute leukæmia, aleukæmic leukæmia, myelofibrosis, and myelosciero sis, could all be placed under the same heading—myelo-proliferative disorder. There is much uneveness of emphasis; five pages are devoted to "Red blood cell inclusion bodies," while the metalblastic anæmias are dismissed in three and a half pages, and the leukæmias are not considered individual ally at all. An aspect of this book which greatly detracts from its value is the failure to indicate the relative importance and frequency of conditions. From the number of times it is mentioned, one might assume that Di Guglielmo's disease (erythræmic myelosis) was a common condition! I consider that this small paper-bound volume without any diagrams or illustrations is expensive.

The Control of Disease in the Tropics, a Handbook for Medical Practitioners. T. H. DAVEY and W. P. H. LIGHTBODY. Second Edition. H. K. Lewis & Co. Ltd., London: 1961. Pp. 422 plus II Illust. 47s. 6d.

The second edition of this handbook loses nothing of the fresh approach which made the first so deservedly popular. In bringing it up to date the authors have added, among numerous other in provements, a section on poliomyelitis, a brief summary of the arthropod-borne virus infections. useful table of the filarial worms, a lucid description of the Heaf test technique, and a short but high informative chapter on Health Education. This is an excellent book for teachers, students, and practically students and practical students. W. M. McCutcheon titioners of preventive medicine in the tropics.

Radiation Protection and Recovery. Edited by Alexander Hollaender. Pergamon Press Ltd. Oxford: 1961. Pp. 392. 70s.

This is an excellent book covering many subjects in radiation protection. Each is in a section written by an expert and with a separate bibliography. At the cellular level, protection of macro-molecules in vitro against damage by ionizing radiation, protection and recovery in bacteria and fungi, and chromosome aberrations, each fill a chapter. Others include the chemical protection of mammals from ionizing radiations, purely from a scientific and observational point of view, mechanisms of protection, extremely well done but without mention of practical applications, treatment of acute whole-body radiation injury in mammals, which is interesting, and the effect of radiation on antibody formation, which is also worth reading. Although the book can scarcely be attractive to the non-specialist, it must be recommended to anyone interested in general radiobiology. J. A. H. Brown

Symposium on Anticoagulant Therapy: Report of the Proceedings. Edited by Sir G. W. Pickering. London: Harvey & Blythe. 1961. Pp. 284. 21s.

Sir George Pickering emphasizes that these proceedings summarize much of what is known of the three major questions on anticoagulant therapy: in what varieties of disease does effective oral anticoagulant therapy involve increased expectation of life and lessen the incidence of complications; what is the best method of controlling therapy and what level of dosage gives the maximum benefit consistent with safety; and if oral anticoagulant therapy works, by what biochemical change does it work. There are rational pleas for the use of Owrens' Thrombotest and persistence with the established Quick one-stage prothrombin test, though a varying choice of methods of expressing results. Whether a laboratory technician, consultant pathologist or clinician should have control is not involved here. The general impression is obtained that for long term anticoagulant therapy the thrombotest should be adopted and that the therapeutic range should be maximal. The final papers are devoted to the use, management and effects of anticoagulant drugs in many conditions and here agreement is more general, though not complete. Professor P. A. Owrens puts the emphasis on life-long prophylaxis in chronic disease with a high tendency for thrombo-embolic complications. It appears established that anticoagulants are used in coronary thrombosis and peripheral vascular thrombosis, and there are reasons for their use in certain cases of rheumatic heart disease, angina pectoris, cerebral embolism and carotid or vertebral insufficiency. Their use in many other conditions, e.g. accidents, is discussed. Many other conditions and points are covered in these papers and discussions which represent the views of many experts, and much work not hitherto accessible is recorded. Many further questions are raised yet to be answered. The proceedings are all most readable and valuable to all involved, and are collected in a well-produced, reasonably-priced book of attractive appearance.

T. H. MCKELVEY

Outline of Orthopædics. JOHN CRAWFORD ADAMS. Fourth Edition. E. & S. Livingstone Ltd. Edinburgh and London: 1961. Pp. 448. Illustrated. 35s.

This book is primarily intended for the undergraduate medical student, for whose purpose it is more than adequate. The usual introduction of the student to this subject with a long and involved discussion of postural mechanisms is happily missing. After a brief but interesting historical chapter, the readers can pass straight on to the meat of the subject. The clear and concise classifications of various disorders and the tables on the local examination of regions will gladden the heart of many a student preparing for a final examination. The chapter on affections of the hip joint is particularly good. Bryant's triangle, and Nelaton's line, beloved of many generations of examiners, are still there; but there is a footnote to the effect that these measures are seldom carried out in practice. There are a few surprises however. Acute infections of the hand are dealt with along traditional lines. Chondromalacia patellæ is described as an uncommon affection of adolescents and young people. In the Services we see this condition all too commonly. The illustrations are excellent and plentiful, and there is just sufficient dogmatism for clear instruction.

D. J. Cowan

Programme Development in the Mental Health Field. 10th Report of the Expert Committee on Mental Health. W.H.O.: Technical Report Series No. 223. 1961. Pp. 55. Available from H.M.S.O. 3s. 6d.

In 1949 this Committee first laid down certain principles and priorities for the organization, training and employment of psychiatrists and allied workers in world mental health. Among other things it pointed out that a modern community should have at least one psychiatrist and two psychiatric beds for the care of the irresponsible mentally sick per 20,000 of population, and that it was desirable for all medical officers of public health to be trained in mental hygiene. This report reviews progress during the past decade and the present state of mental health facilities, but it is mainly devoted to the long-term objectives in mental health teaching, research and public relations. This programme is comprehensive and idealistically ambitious, and may give the impression that all the future activities of a civilized society are destined to be controlled by a new race of psychocrats. Doctors concerned with social and preventive medicine should find this technical publication interesting in its scope and implications.

H. POZNIR

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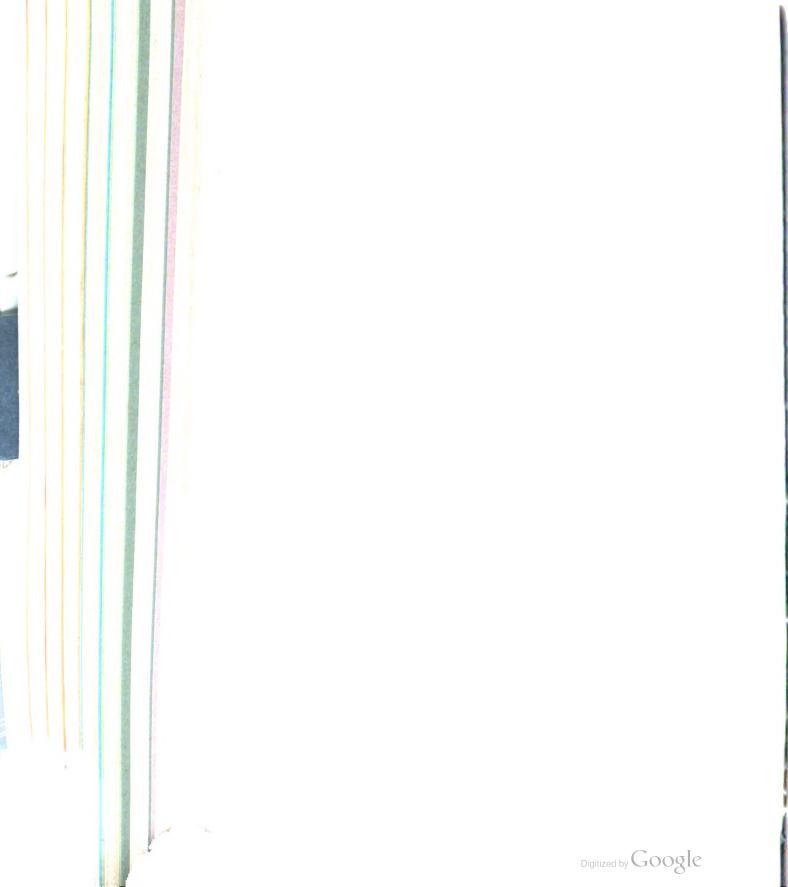
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Vol. 108 No. 1 JANUARY 1962

IMPORTANT NOTICE

THE Journal is published quarterly in January, April, July and October. The annual subscription is 25s. to include the Army Medical Services Magazine; for the Journal alone £1, in each case payable in advance. A single copy costs 7s. 6d.

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There is no set style, but all abbreviations must be avoided. Contributors are on the increase and, with constantly rising costs of production, their papers must be brief. Papers are accepted on the understanding that they are subject to editorial revision, including alterations to condense or clarify the text, and omission of tables or illustrations. Titles must be brief and, if possible, attractive. Lists of References must be on a separate sheet, in alphabetical order, and limited to those mentioned in the text, where they should be in the form "Makewater (1962) observes . . ." or "(Makewater, 1962)." The Harvard system for bibliography is recommended and abbreviations must be according to World Medical Periodicals, 2nd Edition (1957).

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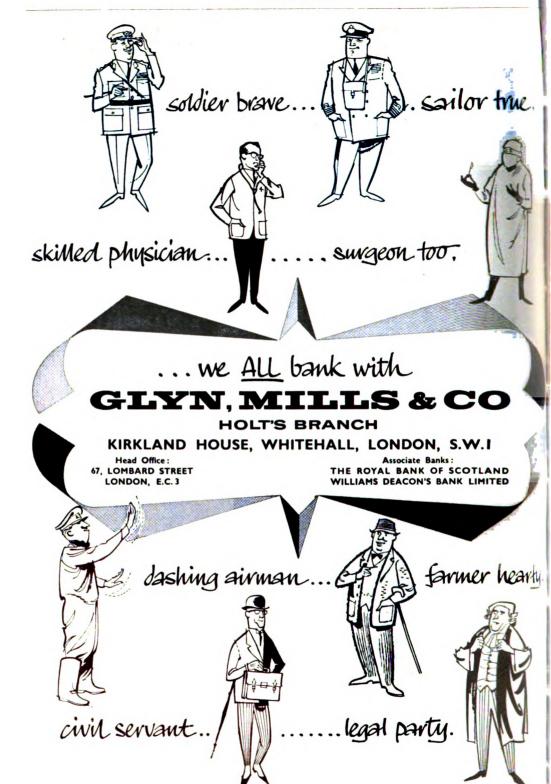
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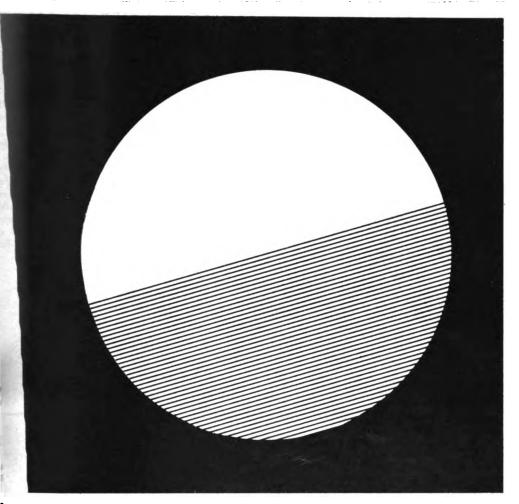
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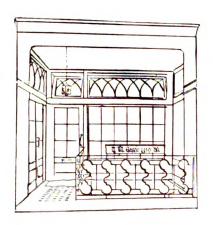
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SMOKING AMONG YOUNG SOLDIERS

COLONEL H. J. A. Richards and Major J. P. Crowdy, R.A.M.C., have surveyed the smoking habits of young soldiers¹. All Army Apprentice Schools and Junior Leader Units were asked to co-operate and a questionnaire was completed by 4,381 young men between the ages of 15 and 18. The Apprentices were learning a skilled trade and the Junior Leaders were training for regimental duties. These age groups have formed less than 5 per cent in previous surveys of smoking in the United Kingdom. The survey aimed first to find whether knowledge of their smoking pattern could help a programme of health education, and secondly to establish a basis for future assessment of the effects of such a programme. Service usually started soon after the 15th birthday, and then more than 50 per cent of the boys were regular cigarette smokers, though their smoking habits were similar to those of school children. By the time Junior Leaders were 17 years old, 79 per cent of them smoked regularly, while Appren-

¹Richards, H. J. A., and Crowdy, J. P. (1961). Brit. J. prev. soc. Med., 15, 84-88.



2 Editorial

was greatest in the 17th year at 15 to 20 per cent, and at the same time there was marked change of habit. The "less than ten a week" smoker disappeared, when the number of those smoking more than 40 a week rose steadily. At the age of the full adult pattern of smoking had been achieved, and 81 per cent were smoker. 40-plus per week.

It has not been easy to compare such surveys because of the various critical adopted for the regular smoker. In this survey "regular smoking" was assessed be for one or more cigarettes per week and five or more per week. Richards and Crowd found that differences between these criteria became negligible after the age of it and five or more cigarettes per week can roughly be equated to one a day, so the think that "the daily smoker" should be accepted as "the regular smoker." Survey in Norway and by the Tobacco Manufacturers on the same age groups also shown that the habit became fixed at the age of 16, but it appeared that more Army became regular smokers than their civilian counterparts, the excess being 17 to 20 per cent for all age groups.

The survey has been extended, as reported elsewhere in these pages, to some the young medical officers who may take part in the health education so obvious needed. Results here were a little more encouraging. Nevertheless it must disheare any campaigner against smoking to see, on the back of the attractive recruiting books produced by the Army Medical Directorate, an advertisement for cigarettes, an only mixed comfort might be taken from its being based on the presumptive glames of one of the other armed services.

CONSIDER THE COCO-NUT

A NEW intravenous fluid, pyrogen-free, sterile, non-sensitizing, very cheap, and plentiful in many places where artificial solutions may not be available, is reported by Harry S. Goldsmith, Chief of Surgery at the Seoul Military Hospital, Korea Coco-nut water was used intravenously during the 1939–1945 War by the Japanese of Sumatra and the British in Ceylon and since then several people have reported well of it. The fruit of Cocus nucifera is best cut at seven months old when its water is most sugary around 5 gm. per 100 ml. of glucose and fructose. The ends of the nure cut back an inch or so, once it has been cleared for cracks in the shell with possible bacterial contamination, and the exposed meat is painted with alcohol. Sterile trocard are inserted and 500 to 900 ml. of fluid can be filtered into a sterile bottle, best used quickly, before bacteria take the chance to grow in it. Its ionic composition is akin to that of intra-cellular fluid with high potassium, low sodium, chloride and phosphate. It is therefore especially fitted for patients with diarrhæa, and it might anyway be useful under adverse conditions in the tropics. Many a doctor has used more far fetched treatment without being thought a nut case.

¹GOLDSMITH, H. S. (1962). Brit. J. Surg., 49, 421-422.

Editorial

3

DIAGNOSIS OF VIRUS INFECTIONS

THE symptoms and signs in some virus infections, such as measles, may make the diagnosis obvious. In others they may only suggest viral disease; isolation of the virus, or demonstration of a rising titre of antibody, or both provide the diagnosis.

If laboratory investigations are to be used wisely, the possibility of virus disease must be considered early. Failure to take specimens at the best time often means that no virus can be recovered, and unless serum is taken early, currently formed and pre-existing antibody cannot be distinguished. The slow development of antibody and the complex laboratory techniques often make diagnosis improbable until the patient has recovered. In an outbreak the process may be quicker once the first case has been diagnosed. It therefore helps to send epidemiological, as well as clinical, information with specimens. Nothing can replace consultation between the clinician, the epidemiologist, and the virologist, but since virus laboratories are often too remote for this, it may be valuable to summarize the methods used.

Respiratory infections can usually be diagnosed by rising titres of antibody in paired sera, one soon after the onset of symptoms and one after about two weeks. In view of the epidemiological importance of antigenic mutation of influenza viruses, the virus from each outbreak must be isolated, and throat swabs should be broken off into suitable buffered fluid and frozen.

"Aseptic Meningitis" may be caused by many viruses. Mumps, lymphocytic choriomeningitis (L.C.M.) and often arthropod-borne virus infections can be diagnosed on paired sera alone. The many enteroviruses share no antigens, so serological diagnosis is impracticable until the virus causing an outbreak has been recovered. They are excreted in large numbers in fæces, and early in the disease throat swabs are a valuable source, but this merely demonstrates the presence of virus—only a rising titre of antibody will incriminate it. Coxsackie, E.C.H.O., herpes and L.C.M. infections can sometimes be diagnosed by isolating virus from cerebrospinal fluid (C.S.F.); similarly arthropod-borne viruses may be recovered from blood. Fæces should be frozen as soon as possible after voiding, blood should either be citrated and frozen, or the serum should be quickly separated and frozen, C.S.F. should be frozen when collected, and throat swabs are treated as described above.

Lesions of the skin and mucous membranes—Smallpox virus can be recovered from the vesicle fluid or crusts of lesions by inoculation of fertile hen eggs; the diagnosis is made after three days' incubation. There are quicker serological tests to distinguish smallpox from chickenpox; they are less sensitive, and cannot distinguish smallpox from vaccinia. Herpes virus may be recovered from skin lesions in the same way as smallpox virus. Adenoviruses and herpes virus can be recovered from conjunctival swabs in cases of conjunctivitis, and herpes and Coxsackie viruses may be recovered from swabs or scrapings of oral lesions. Since these viruses may be present in the throat of normal persons, it is advisable also to take paired sera.

There are many other types of virus infection, and the investigation may be tailored to the particular outbreak. In general it is better to take too many specimens than too few, and attempts should be made to isolate virus and to demonstrate that the patient has responded to infection by producing antibody.

FLASH BURNS FROM THE SELF-LOADING RIFLE

R. D. GARDNER
B.Sc., M.B., M.R.C.S., A.I.M.L.T.

Late Captain R.A.M.C.

I BELIEVE this to be the first case reported of suicide with the new self-loading rifle (SLR).

On the 18th November, 1960, in Berlin a sergeant instructor returned to his living quarters with his SLR, after a weapon training class, and shot himself through the head. I travelled to Berlin on the 21st November to perform the autopsy and found that death was due to shock, hæmorrhage and evacuation of the brain from the gunshot wound of the head. The entry wound was a neat round hole in the skin above the right eyebrow, 15 mm. from the midline. It was 5 mm. in diameter with burned inverted edges and with a narrow rim 4 mm. wide of depressed abraded skin, of the type caused when the muzzle of the gun is placed right up against the skin. The exit wound was an equally typical large ragged cruciate hiatus on the back of the head in the right parietal region.

The evidence suggests that he was sitting leaning forward on the edge of his bed supporting the rifle with one hand, the butt resting on the floor, and the muzzle pressed against his forehead. Measurements of the weapon (trigger to tip of the flash eliminator, 78 cm.) and of his reach (a maximum of 92 cm.) showed that the trigger was easily accessible to the fingers and thumb of his free hand.

There were five groups of flash burns on the forehead around the entry wound (Fig. 1), one below and two on either side of the entry hole, each consisting of many tiny abrasions. Two of the burns were hard to define, being obscured by the eyebrows. Superimposed on the flash burn below the entry wound was a comma-shaped area of "tattooed" skin, which was 4 cm. long and tailed off on the medial aspect of the right eyebrow. A single isolated abrasion was visible on the upper lip just 4 mm. to the left of the midline (Fig. 2) and 15 cm. from the entry wound.

This pattern of flash burns was most unusual and intriguing. I was pondering over the case in the train back to Hanover, when it suddenly occurred to me that the weapon had been fired upside down, because the position of the burns on the brow around the entry wound were the reverse of what one would expect from the escape of gases from the gas eliminator when the SLR is held upright. The single burn on the upper lip remained, however, puzzling, so I examined an SLR belonging to a train guard, and found that this isolated burn must have been produced by a jet of gas escaping from the gas regulator behind the foresight, or from the gas block if



Fig. 1. Flash burns on the brow.

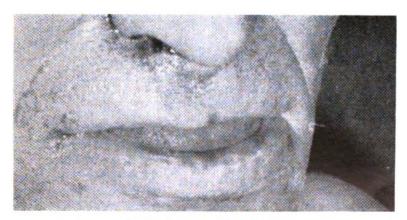


Fig. 2. Abrasion on the upper lip.

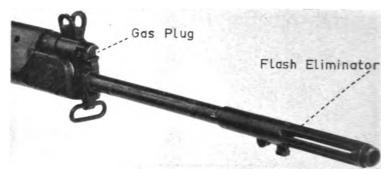


Fig. 3. The muzzle of the self-loading rifle.

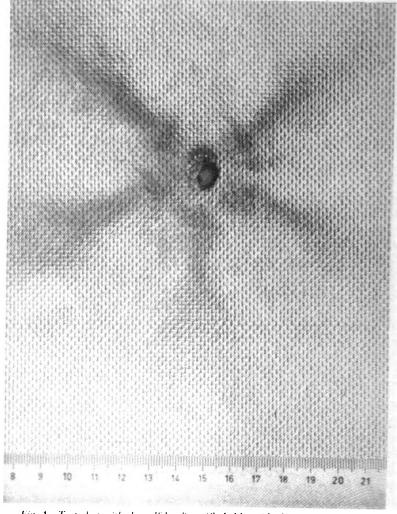


Fig. 4. Test shot with the self-loading rifle held upside down (scale in cm.).

the gas plug had been removed before firing (Fig. 3). I was interested to learn later from the Special Investigation Branch of the Royal Military Police that the gas plug had in fact been removed by the deceased before he fired the weapon.

The next step was to see whether test shots fired from the suicide weapon (a 7.62 mm. SLR, Ll, Al) produced flash burns corresponding with the vents on the flash climinator. It was fitted with a flash eliminator which is screwed into the end of the barrel (Fig. 3). It has five vents, two on each side and one on top, but none on the under aspect. Further along the barrel, behind the flash eliminator, is the foresight and gas block, machined horizontally to accommodate the gas plug which fits into the front (Fig. 3). When the weapon is held upright and fired at close range at painted hardboard targets, the exploding gas and particles escape through the five vents and form a distinctive pattern on the target. This did not correspond to the pattern on the deceased, but if the rifle was turned through 180° in its long axis and held upside down, the pattern (Fig. 4) did correspond, showing that the five flash burns came from the vents on the flash eliminator of the rifle. The strut of metal on the under surface of the flash eliminator lies on top when the weapon is rotated, and protects the skin above the entry wound, where no burns were seen.

Further test shots fired with the muzzle of the gun at various distances from the target showed that the pattern could be seen up to three inches, but disappeared four inches, from the target. Beyond this, only powder marks without any pattern could be seen, up to a distance of 60 inches, owing to the high muzzle velocity.

Summary

A soldier shot himself with a self-loading rifle. The pattern of the flash burns on his face was unusual and distinctive, both because the rifle had been fired upside down and because of its flash eliminator.

I would like to thank Lieutenant-Colonel C. E. Stuart, Assistant Director of Pathology, B.A.O.R., for his advice and encouragement in preparing this article. I am also indebted to W.O.II R. Giddings, Sergeant P. Hill and Sergeant J. Thorpe of the Special Investigation Branch, Royal Military Police, for their assistance with the photography and the ballistic experiments.

THE CONNAUGHT HOSPITAL

ON August the 3rd, 1961, the last patient left the Connaught Hospital, and thus ended a chapter in the history of the Royal Army Medical Corps. Lest it be thought that diseases of the chest are no longer important, or that tuberculosis has been eradicated. let me add that such, unhappily, is not the case; the Connaught Hospital has closed for the same reason that certain regiments have amalgamated—the end of National Service and the need for a smaller more compact Regular Army. But although the hospital no longer exists in name, its work is being continued and its traditions maintained at the Cambridge Military Hospital, Aldershot, where a chest unit has been formed. Soldiers with tuberculosis are sent here from all over the world. The same quality of treatment, including surgical treatment, is being continued, and close liaison is maintained with the King Edward VII Sanatorium, Midhurst.

The first Connaught Hospital, named after the late Field Marshal the Duke of Connaught and Strathearn, was built at North Camp, Aldershot, in the 1890s and remained there until shortly after the outbreak of the Second World War, when it was transferred to Knaphill as a wing of Brookwood Hospital. In September 1946 it moved from Knaphill to its last site at Bramshott near Hindhead, and in January 1955 the sub-title Army Chest Centre was officially recognized. This hospital was built early in the 1939-1945 War and was occupied for most of the War by No. 22 Canadian General Hospital. For the past 12 years the Connaught Hospital has been the Army's main centre for the diagnosis and treatment of diseases of the lungs. especially tuberculosis. The hospital played a full part in the Medical Research Council trials on the evaluation of anti-tuberculosis drugs. Surgery began in 1953 and since then over 500 major surgical operations for tuberculosis and other chest diseases have been carried out. All the major surgery has been done by Mr. G. Kent Harrison, M.D., F.R.C.S. An annotation in *The Lancet* of 17th September, 1960. concluded, "It says much for the Army Medical Services that this specialized surgery should be done with such success under their auspices with the co-operation of civilian The dramatic changes which have taken place in the outlook on tuberculosis in the Army have stemmed mainly from the forward-looking attitude of the Army Medical Services towards this disease. Many soldiers, who in the past would have been invalided, are now serving in high medical categories after treatment and supervision at the Connaught Hospital.

From the hospital have come 21 major contributions by serving R.A.M.C. officers to the *British Medical Journal*, *The Lancet*, *Thorax*, *Tubercle*, and this *Journal*. Since 1957 much research has been done, and is being continued, on the evaluation of chemotherapy and surgery in the treatment of pulmonary tuberculosis in Gurkha soldiers. No less than 169 Gurkhas came to the Connaught Hospital and, of these. 140 were operated on for pulmonary tuberculosis, 2 for bronchiectasis and 1 for patent ductus arteriosus. The resected lung specimens have afforded valuable material for research still pursued in co-operation with the Brompton Hospital.

In 1957 accounts of the Connaught Hospital were given twice in *Soldier* and once in *Hospital and Health Management*. These described the hospital and emphasized the Army Chest Centre's part in carrying out the War Office policy of retaining in

the Army many officers and men who in days gone by would have been invalided with pulmonary tuberculosis. Since this policy was laid down, 78 officers and 212 other ranks of the British Army have continued their service after treatment at the Connaught Hospital. To the Army and to the patients concerned this policy has been an immense gain in terms of morale and well-being.

Many of our officers of both the R.A.M.C. and the Q.A.R.A.N.C., have been trained under the guidance of Sir Geoffrey Todd, K.C.V.O., O.B.E., Ch.M., F.R.C.P., F.R.A.C.P., at the King Edward VII Sanatorium, Midhurst, and without his advice, co-operation and support, the Army Chest Centre would probably never have come into being; it would certainly never have been able to achieve the results it has done.

The future of the site at Bramshott has, I believe, not been decided. It is unlikely that any other unit will move in, and certainly no medical unit will be stationed there. It seems probable that the buildings will be demolished and nothing but the memory of the Connaught Hospital will remain. It is sad but inevitable. Perhaps one day a new Connaught Hospital will be formed. Let us hope that the traditions and fame of its predecessors will not be forgotten.

R.G.M.

Commanding Officers, Connaught Hospital, Bramshott

Colonel R. Murphy	September 1946	— August 1948
Lieutenant-Colonel C. B. R. Pollock	December 1948	- February 1951
Colonel F. C. Hilton-Sergeant	March 1951	- August 1951
Lieutenant-Colonel R. C. Langford	August 1951	May 1952
Lieutenant-Colonel J. Mackay-Dick	May 1952	- August 1952
Lieutenant-Colonel P. Coleman	August 1952	June 1954
Lieutenant-Colonel J. Mackay-Dick	June 1954	— April 1955
Lieutenant-Colonel S. E. Large	April 1955	June 1958
Lieutenant-Colonel J. Mackay-Dick	June 1958	— October 1960
Lieutenant-Colonel R. G. MacFarlane	October 1960	 October 1961

THE MEMOIRS OF WILLIAM CATTELL 1829-1919

Based on an address given at a joint meeting of the Osler Club of London, and the Faculty of Medicine and Pharmacy of the Worshipful Society of Apothecaries in the Royal Army Medical College, Millbank, on 27th October, 1961, by

Major-General R. E. BARNSLEY

C.B., M.C., M.B. (Retired)

Some years ago in a house at Battle, in Sussex, a battered old leather case was discovered bursting with a mass of documents. This turned out to be the memoirs of William Cattell who was born in 1829 and lived to see the end of the Great War in 1919. The dossier runs into something like 400,000 words and weighs nearly a stone. Cattell must have been a remarkable character. He was an enterprising surgeon, an enthusiastic soldier (General Scarlett twice tried to induce him to give up medicine and take a cornetcy in the cavalry), a musician who conducted the regimental band in his own compositions, and an outstanding botanist whose name is commemorated at Kew, Deeply religious, he was also an accomplished amateur actor, an artist, keen on hunting, racing and pig-sticking, and something of a bon viveur with a keen eye for the ladies. Internal evidence shows that the memoirs were written in the period about 1905 to 1911. Much of it clearly consists of contemporary verbatim extracts from notes and diaries, and his grand-daughter remembers the old man fumbling through a mass of letters and cuttings with arthritic fingers and covering himself and his surroundings with a mess of paste in the process of putting them together.

Cattell entered King's College, London, having taken his Matriculation with honours in chemistry in 1850. He joined the Army shortly after and writes:

"Whilst working for the M.B. London at King's College, an old chum told me he had been offered an assistant surgeoncy in the Guards, which he could not accept, and advised me to accept it. I had only to call at the Army Medical Office and volunteer, which I did and put my name down for an interview. My reception was not cordial; the D.G., a scotchman in indifferent health and careworn, with his hand on his liver, curtly demanded 'Who are you to think we need your services?'"

The careworn Scotsman was undoubtedly Sir Andrew Smith who succeeded Sir James McGrigor in 1851. His burden of care was soon to be made quite unsupportable by the onslaughts of the indomitable Miss Nightingale, who carried on a tireless vendetta against him and finally succeeded in dislodging him from his appointment and substituting her protégé, Thomas Alexander, who played a large part in the establishment of the Royal Army Medical College.

"Coming home much hurt I could not conceal my discomfiture and my people communicated with Mrs. Sidney Herbert, the wife of the War Minister, who,

the next day, went to see the potentate and I was summoned for examination. There were some thirty groups of questions. I got home after five and was astonished to hear that Mrs. Herbert, soon after one o'clock, had brought news that I had passed."

She had thus been informed of the result almost as soon as Cattell sat down to face the examiners. In due course he proceeded to Fort Pitt, Chatham, our main military hospital, where he met with a chilly reception.

"The mess was very dreary, the president seldom spoke even to the seniors around him; and, amongst ourselves, conversation was not tolerated. Decanters were ringed so that you might know when the Regent's allowance was exhausted, and we took the earliest opportunity to retire and converse."

He received his commission in the 23rd Foot (Royal Welch Fusiliers) dated 28th March, 1854. Mrs. Herbert, however, did not approve and thought that he would be "safer on a horse." She again visited the D.G. with the result that he received another commission, dated 14th April, in the 5th Dragoon Guards. It was in this famous regiment (now the 5th Royal Inniskilling Dragoon Guards) that he spent ten happy and adventurous years.

A cold war was beginning to warm up, and Russia, having already absorbed the Ukraine and Turkestan, was rattling the sabre and casting covetous eyes on the Bosphorus. When on 27th May, 1854, the regiment embarked at Queenstown for Malta very few thought that the Western Powers, Britain, France and Sardinia, would be involved, and they marched to embark on the *Himalaya* at Admiralty Pier through decorated streets.

Readers of Mrs. Woodham Smith's *The Reason Why* or Mr. Christopher Hibbert's *Destruction of Lord Raglan* will recall that the experience of the senior officers was largely confined to spectacular sham fights and reviews on Wimbledon Common. Lord Raglan himself was selected as commander-in-chief because he was the only man under 70 who had the necessary qualifications. He had an arm blown off at Waterloo and had spent the intervening 40 years at an office desk. None of the divisional commanders was under 60 except the Duke of Cambridge who failed to stay the course and was sent home prematurely.

Cattell writes:

"The keen professional soldier of today can scarcely realize the easy life of those days when commissions were purchased and the Army was considered, especially in the cavalry, as a pleasant means of passing a few years before marriage, or the inheritance of a family estate, necessitated the taking of existence seriously. Once dismissed his drills, professional subjects were banished and sport and amusement paramount. Scarcely anybody thought of the service as a career or as worthy of studying."

Tragedy at Varna

On receiving news that hostilities were about to begin the *Himalaya* sailed into Varna Bay on 12th June, 1854, and the regiment disembarked with all the "pride, pomp and circumstance of glorious war" but in complete ignorance of elementary hygiene and logistics. The newly appointed and very unpopular commanding officer told Cattell that he considered the medicine chests "a useless incumbrance in war"

and immediately ordered his equipment into store at Varna Base. It was very many tragic months before it was seen again. How a few weeks later the pitiful remnants of this fine regiment, harried by iron discipline and ravaged by cholera, staggered back to Varna must be told in Cattell's own words.

"It was very painful to see men handcuffed and strapped to the stirrup alongside a mounted man especially at the trot, as occurred on the last march. Floggings were frequent, the man stripped to the waist and lashed to a triangle to receive the counted lash after lash from the trumpeter and farrier alternately, to note the weals crossing each other till at last the back was scored with purple bleeding bands, degrading as a spectacle and only justifiable as a last resort with a brute.

"Then late in July, came the cholera. During the first week of August several fatal cases occurred. On the 12th, from twelve to twenty men were attacked and most of them proved fatal. Having no medicine but a little red pepper I rode over to Monastir to beg or to borrow opium or anything, but the light division had scarcely anything to spare. On the 11th, there were nine deaths and 25 admissions and a general feeling of depression settled like a gloom on the regiment. In the tents the men were reading their bibles, an unusual sight. If seized they at once gave themselves up for lost and terror increased receptivity.

"One afternoon, as cases were still occurring, the officer commanding in his shirt sleeves went to the brigadier, whose camp was at the south end of our lines and, in an excited manner, urged that the camp should be changed. Scarlett, who had intended moving, assented and expected that the O.C. would make the usual arrangements before moving in the morning. He was astonished therefore, at seeing him ride off into the lines, flinging his shirt sleeves wildly and shouting to the men 'Get on your horses and be damned' and 'Get off this accursed ground.' The excitement brought me out of hospital to ascertain what had happened. There was a panic, men were rushing about to mount and get away helter-skelter the officer commanding and the surgeon in the van. I saw one N.C.O. get his foot in the stirrup and fall back. He turned ashy pale, was brought to the hospital and only survived a few hours. Left with the sick and dying, and without rations (which had been carried off in the flight) I went to General Scarlett for orders. He was quite calm and said 'I am staying with the hospital and so are you.'

"On one occasion the funeral service was being read by our adjutant. When he was about to begin the hospital sergeant, Fisher, ran up and said 'wait a moment another is almost ready.' On being asked 'Is he dead?' the reply came 'Not quite.' In a few moments he was brought out in his blanket and laid to rest with the rest."

An ugly situation arose when a rumour spread that the colonel had been responsible for the jettisoning of the medical equipment at the beginning of the campaign. A deputation of other ranks failed to meet him, as he had been forewarned by his servant and managed to elude them. A few days later he made his exit with a white handkerchief to his face, and an ominously bulky load of grass was seen to leave the camp. He apparently joined his wife at Therapia on the Bosphorus and disappeared from the scene. The remnants of the regiment finally made their way back to Varna, each man able to sit on a horse having to lead two others.

A sergeant-major wrote:

"I will not repeat the general's bitter words to our officers. The men had to listen in silence, he said we were unfit for any sort of duty and should be sent back to Britain. We embarked as a fine body of men and as well mounted as any corps in the service, and look at us now; what a change in ten weeks! We may yet have a change to show what stuff we are made of."

Balaclava

After a stormy passage the regiment disembarked at Balaclava. Cattell rode with his regiment in the famous Charge of the Heavy Brigade and was an eyewitness of the disastrous Charge of the Light Brigade. His long and dramatic descriptions of both these events, however, give such a comprehensive view of the whole battlefield that he clearly supplemented his own observations by reference to Kinglake and other writers. Early in November the terrible winter of 1854-1855 set in and we are given a first-hand story of men frozen at their posts, of feet wrapped in bits of blankets as the boots wore out, of starving and ravenous horses stampeding through the lines. Cattell describes how, in the morning, his batman would bring glowing charcoal to melt his beard, solidly frozen to the blanket, before he could get up. With the coming of spring things were beginning to look more cheerful. Some of Miss Nightingale's nurses arrived in April, followed in May by a visit from Florence herself. She was obviously ill and, almost at the end of her tether, had to lean on Cattell's arm as he conducted her round the hospital.

The regiment also received a visit from the famous and flamboyant little French chef, Alexis Soyer:

"He galloped up like a general to the saluting point, his white burnous streaming in the wind, with silver striped blue overalls, gold braided vest and red and white kepi. Even riding with generals he was forever foremost. Lunch in the mess was a hilarious affair, so much that one of the officers suggested 'Soyer tranquille' as a suitable motto for him."

At long last a series of deafening explosions announced the evacuation of Sebastopol. Amid scenes of wild orgy, drunkenness and pillage, Cattell saw drunken soldiers lying smoking on sacks of powder, throwing matches down and blowing themselves sky high. And, at the end of it all, nobody seems at all clear as to what it had all been about. After months of misery, muddle, hardship and suffering Cattell sums up the situation:

"Ultimately we left behind us a hundred and twenty six well filled graveyards and for what object? Ostensibly some Russo-Turkish dispute over the keys of the Holy Places which did not concern us, possibly to consolidate the French Empire."

After the dramatic events of the Crimea we find ourselves in smooth waters and are given a picture of the life of an Army surgeon in mid-Victorian England.

The regiment reached Portsmouth on 28th June, 1856, and, after being inspected at Petersfield by Queen Victoria in a red tunic, entrained for Edinburgh. After a fall from his horse he consulted Syme "who was delighted at finding my great toe driven back under my sole, a rare accident." It was here also that General Scarlett



again tried to persuade him to take a cornetcy in the cavalry, but he again refused as he hoped to have an opportunity for studying for his Fellowship. A visit from the general appears to have been especially trying. He was devoted to the game of whist which had just been invented. After mess he would sit down to the card table, with his special bottle by his side and successive relays of drinks were brought out throughout the night. Junior officers were detailed into "watches" to play with him until he was driven home in the morning at six o'clock. As a pièce de résistance on guest nights, Lacy, the old mess waiter, would be called in and would proceed to demolish the door panel with his bare fists, crunch up a wine glass with his teeth, swallow the pieces and finally pin himself to the door with a two-pronged fork driven through a fold of skin. On another occasion an officer, after a hard day's hunting, fell asleep in the mess when "Sir William, an old Death or Glory Boy, exploded some gunpowder under his chair which thoroughly lifted him."

From Scotland the regiment moved to York and each officer was detailed to lead the singing on the march. Cattell, who could never remember English verse, had won many prizes for the classics and began to intone 300 lines of the Antigone much to the amusement of the troops who implored him to "try something a bit lower." A curious facet in the complex character of this hard-riding yet studious young cavalry doctor was his obsession with the supernatural and the occult.

"In bed one night I determined to raise the devil in the shape of a huge monkey in a red jacket, who soon appeared at the foot of the bed but so distinct that he persisted through the night though I tried to make him disappear."

The regiment moved to Aldershot and it was here that the number of children to be christened reached such large proportions that the vicar decided that, to save time, an additional font should be used at the opposite extremity of the aisle where a curate could also officiate. It caused some consternation among the young mothers when he made the announcement "As from next Sunday babies will be christened at both ends."

Food for Thought

The 2nd Life Guards were also stationed at Aldershot and their medical officer was the famous naturalist Frank Buckland, who would hang dead rats and other similar curios among his clothes, so that in the hot weather his quarters became "odiferous." He must have inherited his eccentricity from his father, the Dean of Westminster, who was in the habit of inviting the leaders of science and the arts, Herschel, Liebig, Faraday, Ruskin and Brougham, to dine. He regaled them on a series of succulent and exotic dishes the ingredients of which were not made known until the end of the meal. History does not record the feelings of these distinguished men when they learned that they had been partaking of "puppies and mice, tortoises and rats, varied with potted ostrich and pickled horse, frogs and the succulent snail."

It was at one of these curious dinners that various exhibits were handed round for inspection. One of these was the heart of Louis XIV shrivelled to about the size of a prune. The absent-minded Dean seeing this at his elbow promptly popped it into his mouth and swallowed it. So now the heart is interred inside the Dean in Islip Cemetery!

In the midst of many social events Cattell found time to attend a reading by Charles Dickens whose dramatic talent greatly impressed him. "To appreciate thoroughly some dramatic passage as in Oliver Twist, you should hear him read it." When he moved on to Brighton he made friends with a fabulously rich Russian who was surprisingly engaged in designing "A cigar-shaped submarine boat capable of crossing the Atlantic." At one stage earlier in his life he had been present at the funeral of the Duke of Wellington and remembered seeing him "a tall man with a prominent aquiline nose, sitting erect on horseback, looking straight before him in blue frock coat and white trousers strapped tight at foot."

In 1873 Cattell sailed with the 10th Royal Hussars to India and becomes broadly farcical in relating the incident of the constipated elephant.

"One evening came the news that an elephant was suffering from serious constipation. Someone suggested the fire engine and the youngsters were soon on the scene. Aided by one of the farriers an enema was forcibly administered to the animal's immediate relief."

Five years later, in 1878, clouds were banking over Afghanistan and the regiment moved north through the Khyber Pass. It was on this march that the 10th Hussars suffered from the disaster immortalized in Kipling's poem Ford 'o Kabul River. Cattell records how he saw horses dripping with water galloping back through the camp. Only 30 out of the 76 men of the squadron survived to reach the opposite bank.

Then as Now

The regiment played a full part in the second Afghan War when Hyda Khan, heavily backed by the Russians, rose against the British Raj. Cattell's views on Russian aspirations make interesting reading today. He records how, during a routine sanitary inspection, he came upon four mullahs blindfolded and lined up before a firing squad, and he quotes the views of the Russian Skobeloff, who himself had been responsible for the massacre of 8,000 men and women at Gocktepe. He held that our system of executing a few Mussulmen men had no effect and only provoked hatred, whereas some terrible overwhelming blow was submitted to as an act of God. By these methods Russia had annexed Kazan, Astrakhan, Georgia and other areas. We, on the other hand, had sent some 25 expeditions to the North West Frontier, and, after victory and a separate so-called peace, had withdrawn, which only succeeded in conveying to the natives an impression of weakness and defeat.

"Czarism strives to tyrannize over cultured nationalities extending its tentacles over Europe and Asia in thirst of universal dominion" writes Cattell. "Since the Mongol invasion of the Golden Horn in the 13th century Russia has been a pyramid of oppression."

In 1881 after a short stay in Rawalpindi, his Indian tour came to an end and his reflections on the future of the Empire and his opinions are startlingly prophetic in character.

"India farewell! whose various races we have compelled to live in harmony, whose people we rule but who have not yet learned more than to live in peace, slumbering in dreams of days gone by. Held down by a people who cannot propagate in the country and therefore can never people it or occupy it as the dominant



race. It seems historically certain, therefore, that a handful of aliens cannot for ever keep in subjection a large and increasing race that yearly becomes more intelligent and insistent in their demands for self government. Nor can the generation foresee what God's purpose is slowly evolving. Empires rise to their zenith and crumble into nationalities as these attain knowledge and self reliance. As the tree at maturity dies and saplings take its place, so there is no abiding city, no permanent imperialism, whose ambitious title sounds the death knell of Empire."

From India Cattell came home to Aldershot. The Cambridge Hospital was just getting under way and, as the officers' mess had not been built, he lived with his old regiment the 5th Dragoon Guards and was delighted to see the hoof of his old charger Bob, who had taken part in the Charge of the Light Brigade, on the mess table. Today it is still a valued part of the mess plate of the 5/6 Inniskilling Dragoon Guards. After a brief tour at home, during which he was elected to the Linnean Society owing to his high reputation as a botanist, he was posted to Malta, where Malta Fever was ascribed to water contamination, and thence, in 1884, to Canada while he was a Surgeon General.

It must have been about 1886 when he finally came home and was posted as Principal Medical Officer, Cork. The Fenian troubles were at their height and estate agents had to drive around with armed escorts of constabulary. An intelligent parish priest told an American visitor that for half a crown you could hire a dozen assassins within ten miles. Clandestine meetings of the Fenians for drill were being held in the hills around and a famous local character, Father Healy, in a sermon on temperance said "It's whiskey that makes your homes desolate and makes you shoot your landlord," then with a pause, "and makes you miss them."

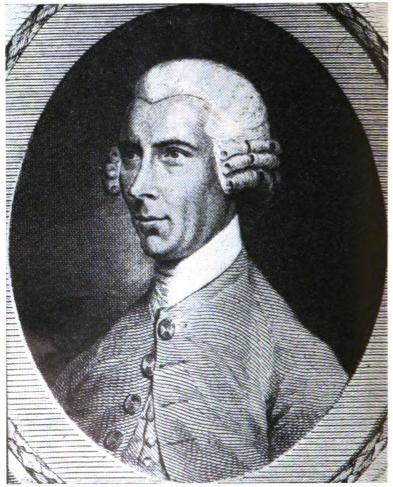
He leaves Ireland with this valedictory tribute. "A race musing yet adventurous, open to every political influence, passionate, impulsive, delighting in the joy of battle, ready to die for the banner it follows. Have any people save Israel suffered more?"

There is little more to tell. Cattell retired in November 1889 and though in 1907 he caught double pneumonia when he was given the last Sacraments he recovered and retained his faculties until his eventual death in 1919.

The last chapter, with its wistful title "Et Aprés" scrawled on the cover in the old man's handwriting, forms a pathetic epilogue to the memoirs. Cattell was now the only medical officer of the Crimean campaign still sound in mind and body. He quotes several letters from his old companions in arms. "Tom Hampton, though almost blind still has Kinglake's history and Russell's correspondence read to him and adds 'Although for years I used to put down a bottle of champagne a night, now I only drink barley water and milk." Another friend, Byng of the 10th Hussars, at Aldershot in 1899 was "limping about maimed by inoculation for typhoid." Swinfen, who had gallantly stood by Cattell in the cholera camp at Devna, and with whom he had ridden in the Charge of the Heavy Brigade wrote "No doubt our kind friends look upon us as fossils, and so we are in many respects, but, as dear old Aleck Elliott used to sing, 'Our hearts are both youthful and mellow.' And that is something to be grateful for."



WILLIAM CATTELL 1829—1919



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JOHN COAKLEY LETTSOM 1744—1815

The founder of the Medical Society of London

SMALLPOX

From the Lettsomian Lectures for 1961 given before the Medical Society of London by

Major-General W. R. M. DREW
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PART I

From earliest times smallpox has terrified mankind for it is a disease which kills in large numbers and disfigures its survivors. It is more than 50 years since Ruffer and Ferguson (1910) published their note on an eruption resembling that of variola found in the skin of a mummy of the 20th Dynasty (1200-1100 B.C.). Their work on the histology of the skin of mummies from the time of Rameses V is proof that smallpox was then prevalent in Egypt. One of the first accounts is that of Rhazes, the Persian physician, who practised in Baghdad at the beginning of the 10th century A.D. He distinguishes carefully between smallpox and measles and speaks of weak or mild pox, which was translated by Greenhill (1848) as chickenpox. He also says that hardly anyone escapes these diseases. In 1593 Simon Kellawaye appended an account of the disease to his treatise on plague. In 1603 the Company of Parish Clerks began to keep their Bills of Mortality of London; these continued to be printed for more than 200 years and are a fair guide to the mortality rate of smallpox in London (Creighton, 1894).

Thomas Sydenham kept careful notes on the smallpox epidemics of his time. In his account of the disease published in 1677 he separated it from scarlet fever and also distinguished carefully between confluent and discrete smallpox. He said "that whoever labours under the distinct kind hardly needs a Physician but gets well of himself and by the strength of nature." From his writings and from his success in treating smallpox Sydenham achieved a great reputation. Smallpox at the beginning of the 17th century was largely a form of pestilence of the upper classes, among whom it caused great despondency and alarm. High living, excessive exercise and poor stamina were considered important predisposing causes. Thomas Willis noted that the mortality increases with the age and said that "the sooner a child hath this disease the more secure they are." It was Richard Morton who gave us a detailed clinical record of the disease, remarking that infants rarely get severe kinds of smallpox. Morton was a protagonist of gentler methods of treatment than Sydenham. The tenth day of the disease was considered a critical one. Emetics, purging and bleeding were the treatments in vogue. Paregoric remedies of a heating character were used early in the disease, while later during convalescence a cooling regimen was prescribed. Sydenham is said to have abandoned heating treatment in his later years. Feelings about the treatment of smallpox ran high in those days. Dr. Richard Mead even fought a duel with Dr. Woodward, the Gresham professor of physic, on the advisability of purging.



Goodall (1933) says that inoculation against smallpox probably began in India even before the Christian era and was practised in China in the 11th century A.D., so it is evident that its value had been appreciated since early times. Inoculation against smallpox had long been practised in the Middle East when Emmanuel Timoni, a Greek living in Constantinople, reported in 1713 that the practice of inoculation against smallpox would confer immunity. As a result of the efforts of Lady Mary Wortley-Montague, the wife of the British Ambassador in Constantinople, inoculation was first performed in this country. One of her children was inoculated by Doctor Peter Kennedy during a severe smallpox epidemic in 1721. With the support of Sir Hans Sloane, president of the Royal Society, a series of experiments were performed on a group of prisoners in Newgate Jail and, in April, 1722, some of the Royal Family's children were inoculated. In spite of some failures and deaths, the practice of inoculation or "variolation" had come to stay. The idea of giving inoculation to their children to prevent smallpox appealed to the average citizen much more than it did to the medical profession.

There were many variations in the methods employed. Some injected the contents of a pustule from a person with discrete smallpox into an incision made by a surgeon in the patient's arm. A piece of lint was then applied and this was removed after about 24 hours. About the eighth day the symptoms and rash of mild smallpox appeared. All kinds of treatments in preparation for inoculation and for the resulting disease were recommended, but most of them fell into disuse. The Sutton brothers, Robert Sutton at Bury St. Edmunds and Daniel Sutton at Ingatestone, Essex, helped greatly to extend the practice especially among the wealthy classes. Between 1764 and 1766 Daniel Sutton is said to have inoculated more than 20,000 persons without a single death. He made only one puncture using fluid from an early vesicle. Usually there was a rash, but even if there was no reaction, Sutton pronounced the patient protected. The advantage of inoculation was that the person had the disease locally and mildly, instead of running the risk of a fatal outcome. The general results were of a more doubtful nature, since it was felt that epidemics could begin in this way. In spite of arguments to the contrary, there is no evidence that inoculation increased the mortality of smallpox as a whole. In 1766 Daniel Sutton was put on trial at Chelmsford Assizes for spreading the contagion of smallpox, since there was an epidemic in the town at the time, but he escaped conviction.

Among those who practised inoculation with success was Doctor Thomas Dimsdale, who acknowledged his indebtedness to the Suttons, though he said in his book that they had little claim to medical erudition. Possibly as a result of the publication of his book in 1767 and the interest it aroused, he was invited, through the Russian Ambassador in London, to travel to Moscow to inoculate the Empress Catherine II of Russia and her son. He travelled there in 1768 when he was 56 years of age and inoculated the royal patients, for which he received a barony, a fee of £10,000 and an annuity of £500 together with the honorary rank of major-general in the Russian army; but the Empress evidently had some doubts about the success of the operation, for she had horses posted, in relays, all along the road from Moscow, so that in the event of failure he could make good his escape to the frontier. On his return to London, Thomas Dimsdale and John Coakley Lettsom began one of the strangest

controversies on paper between two medical men. In 1774 Lettsom proposed to set up dispensaries so that the poor in the cities could be properly inoculated. Dimsdale opposed this because of the risk of spreading smallpox, and quoted the increasing number of deaths in the Bills of Mortality. Their paper war lasted for nearly five years, during which Lettsom and Dimsdale often exchanged manuscripts or proofs for correction before publication. Eventually they were reconciled, possibly because they were both friends of Doctor John Fothergill.

In 1796 Edward Jenner of Berkeley, Gloucestershire, first performed what he called "vaccination" using cowpox matter taken from the hand of a milkmaid. The results of his experiments were eventually published in 1798, though his paper was refused earlier by the Royal Society. At first his views had a poor reception but slowly with the help of his London colleagues and with the constant encouragement of John Hunter the practice of vaccination was generally accepted both in this country and abroad. Lettsom wrote in support of Jenner that "Cowpox has long since been found a security in smallpox, but it had never been applied, until the genius of Jenner introduced the practice, as a permanent security against variolous infection." Lettsom moreover remarked that not more than four had died in 60,000 vaccinated persons, though more than 8,000 children, under the age of four, died every year largely from smallpox. The London Bills of Mortality show that the death rate for infants, under five years of age, fell steadily during the 18th century. Of course only a proportion of these deaths was due to smallpox, but Lettsom believed that this disease accounted for greater numbers than the London Bills implied. The London Smallpox Hospital, which was founded in 1745 for isolating patients with the disease and for inoculation, eventually in 1808 offered vaccination to all those who applied for it as out-patients. In 1840 inoculation was prohibited by an Act of Parliament, but finally in 1856, after much opposition on scientific and religious grounds, vaccination became compulsory. Vaccination was carried out from arm to arm until 1880 when Koch recommended that glycerinated calf lymph vaccine be employed. It is largely thanks to the work of Copeman, Gordon and others with their cross-immunity experiments that we have a satisfactory means of protection today.

In the second half of the 19th century it is estimated that approximately 80 per cent of infants were vaccinated, yet in 1871 there were still many deaths from smallpox in England and Wales, and they were estimated to be 5 per cent of all the deaths for that year. Another serious epidemic occurred in 1902, when 2,500 persons died of the disease. Charles Creighton, author of A History of Epidemics in Great Britain, published in 1891, was not a supporter of Jenner's views nor indeed of vaccination. Professor Major Greenwood, summing up the controversy in his Study of Epidemic and Crowd Diseases (1935), says that the results of vaccination have not been proved statistically one way or the other, but most of us would acknowledge from our own experience that successful vaccination will prevent smallpox.

Today smallpox virus gives rise to vesicular skin lesions in man. It is closely related to a large number of different pox viruses each affecting one host species and giving rise to names like cowpox, mousepox, elephantpox, etc. It is sometimes possible for one type of virus to obtain lodgement in another host, but this should cause only a local lesion. Vaccinia virus probably originated either from the cowpox

or the smallpox virus. Under the electron microscope all show similar brick-like forms; they have similar properties and are readily acquired in the laboratory. Since vaccinia is so much more easily handled, it has been used for most of these studies. The virus can survive drying and storage for many months.

Pathogenesis of Smallpox

Downie (1959) has shown that the virus enters the upper respiratory tract, after which there occurs a short viræmia. The virus then localizes and multiplies in the cells of the reticulo-endothelial system. During the incubation period, the virus continues to multiply in the reticulo-endothelial cells, and just as the clinical symptoms begin, it spills over in the blood stream. This secondary viræmia lasts for two to three days. The virus is then extruded into the skin, with the production of the focal rash. If the viræmia lasts more than two or three days, the patient dies. Theoretically, if one could increase the blood antibody titre quickly at the beginning of the viræmia, one could prevent the skin rash and even the death of the patient.

Vaccination causes active immunity which is slow to develop. On the other hand passive immunity is conferred rapidly following an injection of anti-vaccinial gamma-globulin. The successful use of anti-vaccinial gamma-globulin to lower the incidence of smallpox in contacts was first reported by Kempe, Berge and England (1956). In Britain this form of gamma-globulin is prepared by the Lister Institute from blood donors in the Army vaccinated 20 days previously. At first produced as a liquid, it is now available in the form of a powder which is re-dissolved with some difficulty, but its advantage is that in this form it will retain its potency indefinitely. The use of vaccination followed closely by an injection of this gamma-globulin is probably the best means now available to raise the immunity in close contacts of the infection.

Pathology

In the skin there is first capillary dilation and then a perivascular infiltration with mononuclear cells. The epidermal cells show vacuolation of the cytoplasm, swelling and disappearance of the nuclei. The cells of the malpighian layer proliferate, forming a papule. As some of the epidermal cells degenerate, they burst forming a vesicle, the loculated walls of which are not destroyed. With the invasion of polymorphs it becomes a pustule. In the process of healing the fluid is absorbed, and epithelium grows in from the edges under the scabs, which consist of degenerated epithelium and debris. Formerly, secondary infection with staphylococci and streptococci was considered to be of importance, but today it is realized that many of the pustules remain sterile. In hæmorrhagic cases there is bleeding into the skin, from orifices and into the sub-pleural and sub-endocardial tissues. A pneumonia of the virus type is found in fatal cases, and there is mononuclear infiltration of liver, kidneys and suprarenals.

Epidemiology and Geographical Distribution

At the present time smallpox of the major type is mainly concentrated in India and Pakistan from where, in 1958, there were 218,000 cases reported (Fig. 1); in 1959, this figure fell to 50,000. In both these years about 20,000 cases were reported else-



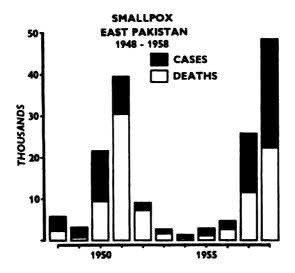


Fig. 1. Smallpox incidence and deaths, East Pakistan, 1958. (After Cockburn, 1960).

where in the world. The minor type, prevalent mainly in Africa and South America, is considered to be a distinct form of the disease and in the past year many localized outbreaks have been reported from the Congo. It is said that many Africans are now avoiding vaccination altogether, preferring arm to arm inoculation by their witch doctors (Gelfand, 1961). Smallpox is not particularly infectious during the incubation period. Once the clinical symptoms begin, droplet spread is important, but the patient is most highly infectious in the pustular stage of the eruption. The virus can survive outside the body in clothing and blankets for a long time. Dead bodies may be infectious. In Lancashire an outbreak was ascribed to raw cotton imported from abroad.

Since 1930 smallpox has not been endemic in this country. However, there have been more than four outbreaks in recent times.

An Asian seaman reached Glasgow from India on 6th March, 1960. Two days later he was admitted to hospital with headache, cough, fever and signs in the chest. An X-ray examination showed patchy consolidation in the upper lobe of the left lung. On 14th March a papulo-vesicular rash developed on his face, trunk and extremities. The eruption was sparse and the vesicles dried up quickly. The lesions were not all at the same stage of development and he had five good vaccination scars. On two occasions he was demonstrated to the class for the Diploma of Public Health as a case of chickenpox and was eventually placed in isolation. By early April the laboratory had confirmed the diagnosis of smallpox in 19 out of 21 patients suspected of it. One public health student was one of six unvaccinated or unsuccessfully vaccinated persons who died in the outbreak. This epidemic emphasizes the clinical difficulty in an Asiatic in differentiating between chickenpox and smallpox modified by previous vaccination.

The Brighton outbreak of December 1950 (Fig. 2) is probably one of the best known and resulted in 29 proved cases of smallpox and ten deaths. An officer returned from India by air at the end of November, and for the next fortnight was ill with a rash on his face and wrists at the home of a Brighton taxi-driver. On 27th December the taxi-driver, his daughter and a telephonist



BRIGHTON SMALLPOX OUTBREAK

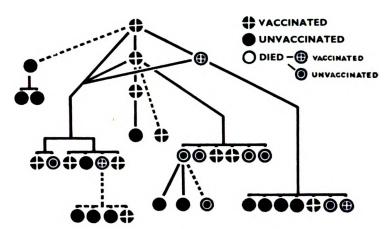


Fig. 2. Diagram of Brighton smallpox epidemic, 1950. (After Parker, MacCallum and Bradley, 1952).

were admitted to hospital with typical smallpox, later confirmed by the laboratory. The taxi-driver died even though he had been vaccinated in infancy and re-vaccinated in 1916. Six of the laundry staff, ten nurses, two of the domestic staff and a gardener acquired the disease. Since it was Christmas-time an unusually large number of contacts had to be traced all over the British Isles. The undertakers and crematorium staff refused to handle the bodies so that the local public health staff had to bury the dead. This epidemic was remarkable on account of the number of clinical diagnoses which were made. They included leukæmia, septicæmia, virus pneumonia, acute abdominal and various skin disorders, suggesting that many practitioners are unfamiliar with smallpox.

Though a relatively small one, the outbreak at Tottenham in 1957 was important because 24 close contacts of the patient were given anti-vaccinial gamma-globulin and none of them developed the disease. In June, 1957, a woman aged 61, employed as a cleaner at the pathological laboratory and who had not been vaccinated since childhood, developed smallpox. Two weeks later her unprotected grandchild died of confluent smallpox. Careful enquiries showed that two months earlier the laboratory had received the post-mortem specimens of a patient who had died of leukæmia. This patient had been to visit a niece and brother-in-law, who were suffering from suspected chickenpox. The brother-in-law, though well vaccinated, had recently returned from Lagos in West Africa. Altogether six persons developed smallpox but only the two unvaccinated persons died. The early discovery of the chain of infection enabled preventive measures to be applied quickly. Twenty-four close hospital contacts, not previously protected, were vaccinated at once and next day were given anti-vaccinial gamma-globulin, the adults 1 G. and the children 0.5 G. each. Though this was an uncontrolled experiment, none of these 24 persons developed the disease.

In March, 1959, a young medical student in Liverpool who had no contact with the docks, ships, travel or laboratories developed mild smallpox. He remained undiagnosed for nearly three weeks during which five persons visited him regularly. Though not vaccinated for many years all of these five contacts were re-vaccinated, given gamma-globulin and kept under surveillance, and none of them developed smallpox. However, a sixth person, a photographer who came to take a picture of the patient, though vaccinated three times before with hospital staff, had a severe attack of the disease and was rather annoyed in consequence.

In October, 1960, a Dutchman returned from Malaya, and soon noticed a rash on his wrists. He went to the nearest casualty department and mentioned he thought this could be smallpox. Later that day an experienced consultant confirmed the clinical diagnosis. As he had been vaccinated often, no laboratory confirmation was possible. This was another opportunity for giving anti-vaccinial gamma-globulin to the contacts who were not vaccinated on this occasion and there was no further spread of the disease.

(To be continued)

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A TRIBUTE TO SIR JOHN BOYD

A NUMBER of friends are planning to present Sir John Boyd, F.R.S. ("J.S.K.") with his portrait. Would anyone who would like to be associated with this gift kindly communicate with Professor G. J. Cunningham, Royal College of Surgeons, London, W.C.2.

SMOKING AND THE YOUNG MEDICAL OFFICER

Colonel H. J. A. RICHARDS B.Sc., M.B., D.P.H., D.T.M. & H.

Assistant Director of Army Health, Northern Command

It is current Army policy that Administrative Medical Officers are to ensure that health education on smoking, and its relationship with chest disease, is given to the military population for which they are responsible, the chief effort being directed at the young soldier, particularly the boy soldier. While working on the smoking habits of young soldiers, the results of which are noted on an earlier page, we realized that in any programme of health education a factor of considerable importance would be the smoking habit of the educator. The degree of habituation of the instructor might determine the education given. We therefore decided to survey all the young medical officers passing through the Army School of Health at Mytchett. They were mainly National Servicemen but there were also some Short-Service Officers. All were recently qualified and had completed one year or more of house appointments. From June 1959 to December 1960, 271 completed a questionnaire on their smoking habits and opinions. Of these, 121 were regular smokers of cigarettes, 23 smoked a pipe only and 127 were non-smokers. Three cigarette smokers also smoked a pipe regularly. It appears that these young doctors smoked less than had been recorded previously, both by Doll and Hill (1954) and the Tobacco Manufacturers (Todd. 1959). The table compares the present findings and the Doll survey, which it will be recalled, investigated the smoking habits of some 40,000 doctors questioned in 1951, and gave data on the habits of some 24,000 male doctors over the age of 35.

	Present Survey	Doll Survey Ages 35-44	Doll Survey All Ages
Number surveyed	271	8,925	24,389
Percentage Regular smokers of cigarettes	44.6	72.5	72.7
Regular smokers of pipes only	8.5	11.2	14.6
Non-smokers	46.9	16.3	12.7

It will be seen that the age groups compared are not the same and this precludes detailed comparison. There can be little doubt, however, that the percentage of non-smokers has increased considerably, due to a decrease in cigarette smoking. The Tobacco Manufacturers in their Research Papers give no data specifically for doctors, but in 1958 the percentage of cigarette smokers in the Registrar General's Social Class I (professional occupations) was given as 54.2 per cent.

The cigarettes smoked per day were recorded as 0-4 by 7, 5-14 by 48, 15-24 by 56, 25-34 by 9, and 35 or more by 1. Moderate smoking was the rule. Nearly all (92 per cent) smoked less than 25 cigarettes a day, while nearly half (45 per cent) smoked less than 15 a day. Compared with the younger doctors (age 35-44) in the Doll survey, young officers who smoked cigarettes smoke less heavily. To conform with the criteria used by Doll and Hill, consumption is given as grammes per day with one gramme being equivalent to one cigarette. Doll showed that 23.0 per cent smoked 25 or more grammes of tobacco a day, while in this survey only 8.2 per cent smoked that amount. Doll also found that 77.0 per cent smoked less than 25 gm. per day (this survey found 91.8 per cent) and 38.3 per cent smoked less than 15 gm. per day (this survey 45.5 per cent).

The next question asked non-smokers whether they had ever smoked regularly. Twenty-eight (22 per cent) said they had smoked regularly and had given up, while 99 (78 per cent) had never smoked regularly. These are two very interesting findings. First, 36 per cent of all those questioned had never smoked cigarettes and secondly, 22 per cent of the non-smokers, or 10 per cent of the whole group, had been smokers but had succeeded in giving up the habit. The fourth question asked whether there was believed to be a causal relationship between cigarette smoking and lung cancer. The replies were as follows. Yes—245 (90.4 per cent), No—8 (3.0 per cent), Don't Know—18 (6.6 per cent). It is remarkable that on this question, which is interesting in both lay and medical circles, so many of the young doctors had not made up their minds. This might require some explanation, for although only 3 per cent believed there to be no causal relationship between cigarette smoking and lung cancer, this made the total not convinced of the relationship up to 10 per cent of the whole.

The last question endeavoured to find out whether the habit of smoking might influence the opinion of the smoker on the role of cigarettes in the causation of lung cancer. For this purpose it was framed to obtain the information indirectly and asked, "If you are a smoker and you consider there is a causal relationship between cigarette smoking and lung cancer, do you intend to (a) give it up, (b) try to give it up, (c) keep on smoking? The answers we received were (a) 14, (b) 23, and (c) 101. From these answers, and those to question 4 (a), it will be seen that of the 144 smokers, 138 (95 per cent) considered that there was a causal relationship, but of the 127 nonsmokers only 107 (84.3 per cent) considered there was such a relationship. This would seem to be anomalous, nor can an explanation be suggested unless all, or the majority of, those 18 who were undecided on the question of causal relationship were also non-smokers. It is, however, the further implications of this question that are the more revealing. Of the 138 smokers who believed in the causal relationship, 10.1 per cent were of the opinion that they could give up the habit, 16.7 per cent would try to do so, but presumably had little real faith in their resolution and 73.2 per cent would continue to smoke in spite of their belief as to the causal effect.

Discussion

This survey, confined to young doctors starting their professional career, covers an important group of potential health educators of the young soldier. Their smoking habits and opinions are therefore of considerable interest. The most important

finding is that nearly half are non-smokers. As such they would be qualified to give health education on smoking, if it is accepted that this is best given by those who do not smoke cigarettes. Such a proportion of non-smokers is rather higher than might have been anticipated, and it is certainly higher than appeared to have been the case ten years ago, on the evidence of the Doll survey, though because of the differing age groups no detailed comparison is possible. Economic factors may have influenced the situation, for neither the House Surgeon nor the National Service Medical Officer is well paid. Nonetheless the young doctor smokes less than might have been expected and less than an older generation of doctors. Apart from the total number of non-smokers, it was interesting to find that more than one-third had never smoked supporting evidence, if such were needed, that avoidance of the habit from youth is the aim to be achieved. On the other hand, that 22 per cent of the non-smokers had been able to give up the habit would indicate that education against smoking may be successful up to the age of about 25. It was also interesting that of the smokers who thought the habit was a factor in the causation of lung cancer only 10 per cent were going to give up the habit and 17 per cent were going to try. Although many of these would not achieve their present intention, this may be an indication that the future trend may be towards less smoking, at least among young doctors.

Summary

In a survey of 271 National Service doctors, potential teachers of young soldiers on smoking and lung cancer, it was found that they smoked much less than might have been expected. It would seem that the habit is beginning to decline in these young medical officers and nearly half of them were non-smokers. The advantages of this in any effective programme of health education are evident.

This survey was originally planned as a joint project with Major J. P. Crowdy, R.A.M.C., and his collaboration in the early stages is gratefully acknowledged, together with the help of Mr. G. Taylor, who kindly scrutinized the paper for statistical rectitude.

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MEDICINE IN THE CONGO

(A Second Report)

Captain M. A. MELSOM M.B.E., M.B., R.A.M.C.

With a foreword by

Colonel E. H. P. LASSEN

D.S.O., M.R.C.S.

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Ghana was among the first countries to respond to the appeal from the United Nations for military assistance in the Congo crisis. By the end of July 1960 a Ghanaian force of some 2,600 men, consisting of 1 Ghana Infantry Brigade and a contingent of police, had been flown into Leopoldville. The Brigade was supported by 1 Field Medical Company and a Field Surgical Team, each battalion having its full regimental medical establishment of a medical officer and five N.C.Os. of the Ghana Army Medical Service.

For the first three months the Brigade was located in Leopoldville performing garrison and security duties. Medical officers were not fully occupied in their regimental duties and accordingly helped in the Government hospitals and dispensaries. Eventually in November 1 Ghana Infantry Brigade was moved some 700 miles to Kasai Province and, with a Liberian contingent about 250 strong, was responsible for security over some 100,000 square miles. Kasai Province was one of the places to receive the full impact of the economic and administrative breakdown following the crisis, although apart from the mining interests in the south the Province is largely agricultural and its scattered rural population obtain a meagre existence from their farms. As a result of inter-tribal fighting the shortage of food quickly made itself felt, and was made increasingly worse by the influx of refugees. The scenes of want, dirt and privation beggar description; in the hospitals people were dying of malnutrition and deficiency diseases amid appalling squalor. The breakdown of the medical services was complete, and there were virtually no doctors, supplies or skilled nurses. The Congolese medical assistants, dispensières, though they had received no salaries for months, did what little they could, but the situation was obviously beyond their control.

The report which follows gives a graphic account of the appalling conditions in the hospitals and the desperate state of the refugees. An earlier report by Captain Melsom was largely instrumental in bringing the plight of these people to the notice of the United Nations Headquarters and the world at large. All Ghanaian and British medical officers of the Ghana Army Medical Service had similar experiences and did everything in their power to relieve the suffering of the civilian population. Their devotion to duty in these most arduous conditions is in the best traditions of the service.

E. H. P. LASSEN.

MEDICAL PROBLEMS IN SOUTH KASAI

I ARRIVED at Bakwanga, centre of the famine area of South Kasai, at the end of November 1960, and after two or three days organizing the medical centre for the troops decided I would try to find out the state of health in the surrounding area. I considered that unless I had the co-operation of the Congolese themselves, I was unlikely to be able to assess the situation properly. Bakwanga was the capital of the autonomous state of South Kasai, and I decided to acquaint myself first of all with the Minister of Health. He was a pleasant, middle-aged man who had previously been an Assistante Médicale but unfortunately he carried very little authority. He was quite happy for me to do any sort of medical work, but I had to have the permission of the Minister of the Interior who was very strongly against any excursions by a Ghanaian soldier into his territory for any purpose whatsoever. Finally in the course of a week or ten days I managed to persuade the Prime Minister to give his authority and I performed a limited tour. The country within a radius of 75 miles was formerly sparsely populated and was one of poor agricultural potential. It was also the Baluba tribal ground and had been widely devastated and many crops burned in September by Lumumbist troops. For some months members of the tribe who were widely scattered throughout the Congo had been returning to the area for safety, so that by November there were 300,000 refugees in addition to the normal population. many having left their homes with few possessions. Although the majority planted crops on arrival, there was no harvest until the middle of January, and they had virtually nothing to live on for two or three months.

When there was food it was usually cassava or maize, a very unbalanced diet, and there was a tragic situation to be found. The whole population was in varying stages of malnutrition, and in many villages between a quarter and half of the children were suffering from advanced kwashiorkor. The hospitals were full of the worst cases and were undoctored and lacking in food and supplies. Many out-patient dispensaries were being used as additional hospitals under the supervision of the nurse in charge, but there were probably 300 people dying daily in the area. Eventually, when the vastness of the problem was emphasized, the United Nations Organization (U.N.O.) quickly put into operation a large relief programme sending in food and help. Three weeks later, on returning with the Field Squadron to which I was attached from an expedition to East Kasai, I was pleased to see that supplies had already started to arrive, and that a team of doctors from the World Health Organization (W.H.O.) had made a further survey of the area. These doctors, being civilians. were luckier than myself for they were assisted rather than impeded in their work by the Congolese. A pædiatric unit had also been started by a Belgian doctor in Bakwanga under the auspices of the Catholic Louvain University and I tried to help him, but was again prevented from doing so by Congolese Ministers who stated that the people would all be frightened and run away. This was quite untrue. When I made my initial tour, on informing them I was a doctor, I had always been well received. After making repeated requests to various officials for their assistance in allowing me

to start work, I decided that it was not worth waiting longer and began work at the hospital in Miabi, 35 miles from Bakwanga, which I had seen on my earlier visit. I continued to work there for the next two months.

The Miabi hospital has 600 beds and was built by a mine company for its employees. The village previously had three to four thousand inhabitants, but after the influx of refugees it became a small town of 30,000. When the hospital was working normally it had three doctors in residence, but these had all left at the time of Independence. When I arrived the hospital contained 900 to 1,000 patients. None of them had eaten for the past four days and there was no food in the store. The pharmacy, once well stocked, was virtually empty and the diesel motors which pumped water to the hospital, provided light and worked a fairly modern kitchen, were inactive for lack of oil. The staff consisted of one Assistante Médicale and about 17 Infirmières, four of whom had diplomas and were the equivalent of English state-registered nurses. Some of these worked in the laboratory and were quite competent at doing hæmoglobins, malarial smears, examining stools and cerebrospinal fluid. The cases were of all types. A part was reserved for tuberculous and other infectious cases and there were 140 to 150 tuberculous patients and 10 to 15 with smallpox. In the general medical wards there were the usual run of tropical and non-tropical diseases, malaria, anæmias and pneumonias. In the surgical wards there were various traumatic cases and post-operative cases such as hernias, and even a gastrectomy, all of which had been performed by one of the Infirmières who had been assisting the resident surgeon for many years.

In the two children's wards (80 beds) there were 300 sick children along with their parents, as is the custom in African hospitals, so that at night there were five or six people to each bed. During the day the children were all outside in the grounds or were taken off to the village by their parents without any regard to the severity of their illness. This at least relieved the overcrowding. The main disease with all these children was one of acute or chronic malnutrition. All had some degree of marasmus and in the worst ones, every bone in the body was visible. They had been unable to stand or walk for several weeks and contractures of the joints had developed in many. About half of the children had some kwashiorkor, varying from ædema of the feet to gross generalized ædema sufficient to close the eyes, and there was the severe and often intractable diarrhœa which accompanies this complaint. There were a few who were improving, but others had been in hospital for up to two months and still displayed advanced malnutrition, mainly because the food and milk which form the backbone of treatment had been unavailable to the hospital for at least this long. There were also many cases of malaria, including cerebral malaria. Ascariasis or ankylostomiasis was almost universal with gross anæmia confirmed in some to be around 20 per cent hæmoglobin. Respiratory infections too were common.

The staff of the hospital were co-operative, and I made a list of things urgently needing doing. First I brought sufficient food to the hospital for a day's supply and arranged with some American Protestant Missionaries, who were running a delivery service, to deliver enough food the next day for the following week. Subsequently I started indenting for food, which I delivered to the Missionaries who in turn supplied it to the hospital each week. These Missionaries distributed several hundred tons of

food from America in their own trucks. Unfortunately the government of South Kasai is predominantly Roman Catholic and its decisions were influenced to some degree by the counsels of the Catholic Congolese Bishop of Bakwanga. At the time I left the area these same Missionaries had been stopped almost completely from doing any work. Secondly I decided that it was important to increase the supply of drugs to the hospital. I made an inventory of the most important drugs that were there. or were needed urgently in the next few weeks, and procured these from various sources. Luckily supplies of drugs from various Red Cross organizations had been delivered to the Minister of Health in Bakwanga, and he had started a Central Pharmacy for his State with a rather limited quantity of drugs which he had ordered himself. Other drugs from the U.N.O. Central Pharmacy in Leopoldville had also arrived and I was able to take a moderate supply to the hospital. The most notable absentees unfortunately were anti-malarials, a shortage which persisted throughout my time in the Congo. When I next visited the hospital I found the staff were again cooking for patients, but as there was no diesel oil to work the kitchens and no running water for the same reason, they were only able to prepare one meal a day on open wood fires. I therefore spent the next two days procuring diesel oil by filling in innumerable forms and by collecting and delivering it to the hospital in a borrowed three-ton lorry. The motor had not been serviced for six months and broke down the next day! Luckily it was mended by a mechanic from the mine. Eventually the patients were supplied with two meals a day each of which contained protein, either as fish, corned beef, or haricot beans.

Throughout this time I had been unable to look at the children or prescribe treatment for them. However, all was not ready for me to do so yet. One of the most important features in the treatment of malnutrition, and in particular kwashiorkor, is that each child should receive daily supplies of milk. With the severe diarrhœa present in the more acute cases they could receive only very weak concentrations (about five per cent) of skimmed milk, for stronger concentrations aggravate the diarrhœa. As they improved they could be given more concentrated mixtures. Several concentrations must be prepared at least once and preferably twice or more times daily, and each child should receive the correct one. This would be a difficult problem with 300 children anywhere, and although the Infirmières appreciated the necessity of doing this, it was not being carried out. The milk kitchen, a hut which was previously the animal house of the hospital and which still contained a number of guinea pigs, was not equipped with running water or light. The staff were three untrained Congolese women who, although well meaning, had no idea of how to set about the problem. Although the Infirmières had, in most cases, prescribed the correct quantities and concentrations of milk for each child, these had not been carefully weighed out and all the various concentrations were mixed together in one container. The resultant mixture was too weak for the stronger children, too strong for the weaker, and right only for those who happened to be between. I spent several hours demonstrating and working out the mixtures myself but was beginning to despair of ever getting a system to work, when two sisters arrived at the Catholic Mission at Miabi to start work in the maternity department and agreed to control the preparation of milk.

Now I was able to devote my time to the pædiatric wards and started a new system of documentation. With the help of a lance-corporal and a duplicator from the Field Squadron I used the old hospital cards, over-printing the rather special symptoms of malnutrition and the special treatments. The main treatment was of course nutritional. All with severe diarrhea were started on small quantities of three per cent acidified skimmed milk mixed with five per cent sugar, to be taken when possible with a small quantity of rice. Those that were very dehydrated were given subcutaneous perfusions of saline and protein hydrolysate. About half of the cases of diarrhea stopped with this dietetic treatment, and the concentration of milk was gradually increased to five per cent skimmed milk, then ten and finally thirteen per cent. At the same time diets were gradually augmented until they were taking meals containing some protein twice daily. Those whose diarrhæa did not stop with the initial treatment were firstly given sulphonamides and then chloramphenicol syrup. When their diarrhoa was improved they were treated in the same manner as the others. Most of the children received a sparing course of Imferon in the early stages, for they were unable to tolerate oral iron. In those who were better after about two weeks in hospital, stools were examined and the infestation found at this stage was treated. Unfortunately it was not possible to give prophylactic anti-malarials owing to short supply, but cases were treated as they occurred, as were the many intercurrent infections which inevitably crop up in children with such low resistance.

During my first ten days at Miabi I saw several new cases of smallpox in spite of the fact that the hospital had been performing vaccinations for the previous two or three months. The vaccine was found to be out-dated, and I was able to procure some new vaccine from the W.H.O. doctors at Bakwanga. I delivered this to the hospital and the *Infirmières* restarted vaccinating all the hospital inmates and members of the surrounding population who presented themselves at our door. I was also pleased to note that in the children's wards the death rate had decreased from four per day to about one every two days at the end of January. This was certainly partly owing to the fact that the population was receiving food from U.N.O., and consequently fewer severe cases were entering hospital.

I would like to summarize the work done by the various organizations present in Bakwanga. Throughout all the trouble the Congolese hospital of the Forminière had been open to all who wished to attend. It had two doctors and various Congolese assistants and Infirmières. Its supplies had been constantly maintained and some very good work had been done there. The European hospital, which although not large was beautifully equipped, had remained empty. In the middle of January, after discussions between the directors of the Forminière, its doctors and representatives of the W.H.O., it was opened for the benefit of the refugees. Land was also made available for the tented hospital which was erected at the end of January by the W.H.O. The F.O.M.U.L.A.C. (Fondation Médicale de l'Université de Louvain au Congo) before Independence had an extremely well equipped and modern hospital half way between Mwene Ditu and Luputa, about 150 miles to the south of Bakwanga. With the advent of tribal warfare and the formation of the new state of South Kasai, it found itself in the middle of no-man's land unable to work. Some of the staff returned to Belgium, but the pædiatrician, Dr. le Maire, and the nursing sisters

transported a limited quantity of equipment to Bakwanga where they opened a padiatrie in a school for the more severe cases of malnutrition. This was already operating at the end of November and obtaining excellent results. The conditions in the school unfortunately were quite inadequate and eventually, when the W.H.O. camp was opened, it was closed down. Dr. le Maire gave me tutorials in pædiatrics especially on the treatment of kwashiorkor, which were most helpful.

The W.H.O. offered help as follows. In December they sent a succession of experts, each of whom toured the country formulating reports and made suggestions for tackling the situation. One of them wrote a small series of instructions for Infirmières for the dispensaries to follow for the treatment of kwashiorkor, and I am sure this did much good. The reports also led to the setting up of the tented hospital in Bakwanga and to the provision of certain consignments of drugs and smallpot vaccine which were invaluable. They did not, however, send any general duty medical officers to the Province until the beginning of January. These did excellent work, but it is a pity they could not have started at the same time as the advent of the experts.

The Red Cross also did invaluable work by sending consignments of drugs from all parts of the world. Their department in Bakwanga took over distribution of milk powder with trucks provided by the International Red Cross, and vaccinating teams were formed from the Congolese corps of first-aid workers. U.N.O. itself provided all the food and flew it to Bakwanga at the rate of 100 tons per day. At times it meant as many as 15 or 20 planes coming in daily. They also provided about 15 five-tor trucks for its distribution, a group of staff to co-ordinate the supply and distribution airport controllers, and an engineer who supervised all the vehicles and repaired many of the broken-down diesel motors at various institutions in the State.

Finally a group of eight Austrian Army doctors with nursing orderlies arrived in Bakwanga, four of whom started work at the W.H.O. camp, two took over from me about a week after I left, and the other two toured the countryside visiting the dispensaries.

It may be said that there is much interesting and worthwhile work to be found in the Congo, because of the almost complete disruption of the Health Service that has persisted since Independence. Often it was not easy to obtain supplies for hospitals and dispensaries, and one had constantly to be careful not to offend the Assistantes Médicales who had been working as doctors for six months. Many of them are extremely competent and much above the standard of the state-registered nurse. Some of them welcome help from visiting doctors, but others resent it and it is important to tread carefully until one knows to which group they belong. The one invariable thing I found in all parts of the Congo was that the people themselves appreciated your help. That is, perhaps, the most important thing.

M. A. MELSOM.

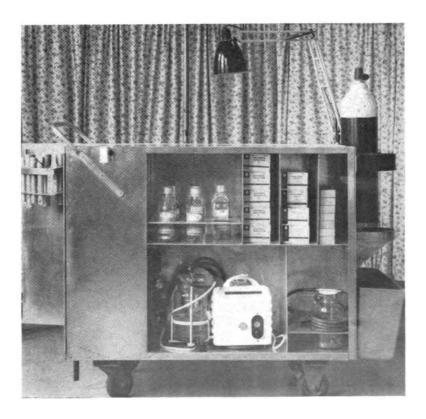
(A further report by Captain R. A. Thompson, M.B.E., M.B., R.A.M.C., will appear in the next number).

INTRODUCING THE RAMCET

Brigadier R. S. HUNT M.B.E., F.R.C.S.(Edin.)

Major D. S. HUTTON M.B., M.R.C.S., D.A., R.A.M.C.

MANY authorities consider a recovery ward to be unnecessary. Experience has shown that it does not save staff and is expensive to equip. Suitable accommodation is often not available. There is sometimes confusion over its proper use; some believing it to be for recovery from operations and anæsthesia, others for all resuscitation both before and after operation. All agree that acute emergencies require prompt attention with staff and equipment readily available. The nature of an emergency can seldom be predicted; respiratory obstruction, hæmorrhage, burns, even cardiac arrest. Only too often time is wasted collecting various equipment and dressings required for treatment and investigation; anything may be needed from a suction pump to a safety pin. With all this in mind the Ramcet was developed as a trolley equipped for the treat-



ment of any common emergency. It may be presumptuous to give it its full name Royal Army Medical Corps Emergency Trolley, but it has passed the stage of being and idea and is in existence and in use at the British Military Hospital, Singapore.

The Ramcet measures 45 by 33½ by 24 inches. It has four wheels and a perambulator brake to hold it still in the working position. The top is covered with Formica as a working surface. An Anglepoise lamp is attached (and can be detached and stored at two opposite corners, one to light the working surface and the other the relevant part of the patient, e.g. the ankle for a cut down infusion. Incorporated in the troller is a master electric plug adaptable for any of the variety of wall sockets so often found in any ward. Through this, current is supplied for the lamps and the electric sucker. All used equipment is placed at the end of any procedure in a receptacle attached to the trolley and is returned to the central sterile supply department which is responsible for maintaining the trolley in full working order at all times.

It is thought that the Ramcet may be an advance in the urgent treatment of emergencies. It may be kept centrally and called for as required, or in the casualty department, surgical ward or admitting ward. It may save life, time and staff. With further trial and modification it will certainly be improved, for in its present form it is not claimed to be perfect either in practical design or in æsthetic appearance.



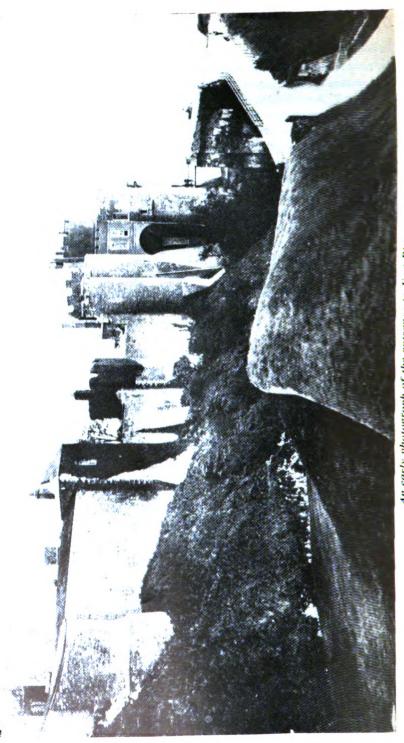
RAMCET EQUIPMENT LIST

Prepacked sterile equipment (carried in side panel). Forty gauze swabs, gauze roll, suture pack, cut down set (adult and child), tracheostomy set (adult and child), cardiac massage set, chest aspiration set, lumbar puncture set, 12 intravenous giving sets, three double male adapters, Polythene tubing, stomach washout set, urethral catheters, scalp vein needles, assorted needles, and cannulæ.

General equipment (stored in side panels and closed end compartment). Sphygmomanometer, stethoscope, tape measure, zinc oxide adhesive tape, Elastoplast strapping, cotton bandages, high-pressure sucker (electrically operated), under-water seal, two oxygen cylinders mounted on end of trolley, spirit swabs, Ryle's tube, sterile masks, assorted request forms and files. Sterile syringes: three 20 ml., six 10 ml., twelve 5 ml., and twelve 2 ml. Intravenous fluids: Dextran (six 500 ml.), Dextrose 5 per cent (five 1,000 ml.), and normal saline (five 1,000 ml.). Specimen bottles: three universal, two with Sequestrin, two with citrate, and two with fluoride.

Anæsthetic Equipment (carried in end compartment and in drawers). Mouth gag, tongue forceps, metal airway (adult and child), laryngoscope blades (adult and child), McGill forceps, 4 Spencer Wells forceps, endotracheal tubes (nasal and oral), endotracheal adapters (McGill), face masks (adult and child), spare rubber tubing, lubricant jelly, scissors, spanner for gas cylinders, bronchoscope, syringe for inflating cuffed tubes and endobronchial suction catheters.

Drugs (stored in end cupboard and drawers). Aminophylline, adrenaline, atropine sulphate, anti-tetanus serum, cortisone, chlorpromazine, calcium gluconate, sucrose 50 per cent, Daptazole, digoxin, heparin, hydrocortisone, insulin, noradrenaline, Lethedrone, Methedrine, Megimide, Nalorphine, Neostigmine, Nikethamide, Promethazine or Piriton, Procaine amide and Procaine, quinidine, thiopentone, water for injection, and Xylocaine (plain with adrenaline).



FORT PITT

M. M. DAVIES

Librarian, Royal Army Medical College, Millbank

DURING the Centenary celebrations of the Royal Army Medical College in 1960, an original painting by Turner with the caption "Chatham from Fort Pitt" was traced and re-produced, among other ways, as the 1960 Corps Christmas card. I was doubtful of the authenticity of this caption, and during a recent visit to the Royal Engineers' Library and Museum at Chatham I was given fresh information which shows that the painting by Turner was painted from Fort Amhurst, with a great deal of "artist's licence" in placing some buildings, and with Fort Pitt in the distance on the left. I have taken the liberty of having the picture re-produced with the various landmarks pointed out. On the right of the picture is the old St. Mary's Church which was rebuilt between 1884 and 1903, and below, to the right of the church would be the Naval Dockyard. The second picture is a copy of an engraving by R. Roffe, published in 1828, of Chatham from Fort Pitt, showing the Dockyard and Fort Amhurst in the centre of the picture.

Fort Pitt was built between 1805 and 1819 the tower being completed in 1808, and the casemate being constructed to hold 540 men. Queen Victoria on one of her four visits to the Fort, and after inspecting the barracks, asked "Are these really the barrack rooms of these invalids?" The reply was in the affirmative. "Well," rejoined the Queen, "It seems very extraordinary that there should be no difficulty in obtaining money to erect a magnificent building like that for convicts, and that it should be impossible to find the means of building a commonly comfortable barrack for our convalescent soldiers." The magnificence of the building is apparent in an early photograph of the entrance kindly lent to us by the R.E. Library. The Fort held infantry from 1810 to 1814, then invalids until 1824 when it was adapted to become a hospital. By 1828 there was also an Invalid Depot there. In 1841 there were 172 patients in the nine wards, and by 1845 female wards were included. Two years later, in 1847, accommodation was also provided for insane persons.

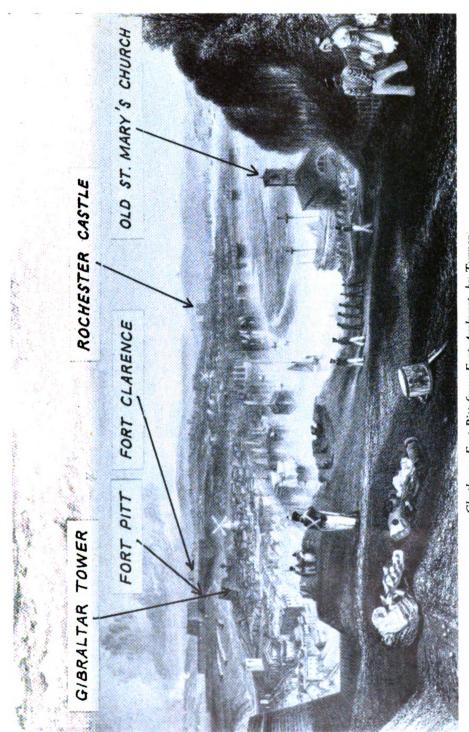
Fort Pitt became a General Hospital in 1849, and after the Crimea War, Doctor (later Sir James) McGrigor started a collection of morbid anatomical specimens, many of which can be seen today in the College Pathology Museum, though the famous collection of skulls is now at the Natural History Department of the British Museum. Surgeon-Major George Williamson, M.D. (1819-1865), was Curator of the Museum from 1841-1849. During this time he prepared a Catalogue of the Museum which then comprised normal and pathological anatomy, anthropology, archæology, zoology, botany and geology, and began his researches on human crania (458 skulls, 29 casts, seven dried heads and two mummies). The Museum and the Library were housed in the casemate of the Fort and formed the basis of the teaching collection when the Army Medical School opened in 1860.

During the 1914-1918 War, Fort Pitt was again used as a hospital, but today it is a school for girls. One block, the "Crimea Block" is in use, although it was due

40 Fort Pitt

to have been demolished in World War I, and what at one time was a ward is now the school gymnasium. It is interesting to note that many of the old relics of the early days have been preserved by the school authorities. The old ablution rooms very small with tiny basins sunk into square slabs and the various signs painted on the walls, are still the same. Most of the underground buildings and walls have been demolished to make way for playing fields and tennis courts for the school.

I wish to thank Colonel Sandeman, Librarian of the Royal Engineers' Library, and Miss Sacket the Headmistress of the Girls' School, Fort Pitt, for their kindness and help in research.



Chatham: Fort Pitt from Fort Amhurst, by Turner.

Chatham: Fort Amhurst from Fort Pitt, from an engraving by R. Roffe.

LETTERS TO THE EDITOR

EPIDEMIOLOGY OF SKIN DISEASES IN AFRICA

From Dr. James Marshall, M.D., late R.A.M.C., Head of the Department of Dermatology, University of Stellenbosch.

Sir,

A pilot survey on this subject has yielded such interesting material that I am preparing, with the assistance of the South African Council for Scientific and Industrial Research, to make a large-scale investigation of the distribution and incidence of skin diseases on the continent of Africa. The ultimate aim is to establish a central office for information and a reference library of literature and photographs.

I wish to approach not only those in scientific and academic institutions, but also anyone who practises or has practised in Africa who could supply information, even if it were only on a limited field of the question. Questionnaires will be sent on request to anyone willing to help.

Simon's View,
Sorrento Road,
St. James, C.P.,
Republic of South Africa.
25th January, 1962.

Yours faithfully,

JAMES MARSHALL.

RECRUITING TECHNICIANS TO THE MODERN ARMY

From Brigadier L. R. S. MacFarlane, O.B.E., Q.H.S., M.A., M.D., D.P.H., Director of Pathology, War Office.

Sir,

I feel that Corporal Chalk's letter in your last issue (October 1961, p. 240) calls for some comment. While I would not quarrel with his statement that few National Service Laboratory Technicians sign on, this is understandable as many of them have jobs to return to. On the other hand the number of recruits wishing to take up laboratory work as a career is most gratifying and rather explodes his views. I think if he had a more universal experience of the Army, he would see that so far from the laboratory technician being considered in such a low sphere, the average soldier considers the laboratory technician rather a privileged person, who escapes many of the more mundane duties.

As regards advancement, discussions are already taking place with a view to laboratory technicians being able to reach W.O.1 in their special subject and even in a few cases, if they have certain qualifications, commissioned rank.

ARMY MEDICAL DIRECTORATE, LANSDOWNE HOUSE, LONDON, W.1. 1st February, 1962. Yours faithfully, L. R. S. MacFARLANE.



INVESTIGATING SCRUB TYPHUS

From Dr. R. S. Kocen, M.B., M.R.C.P.

Sir,

The description in the October Journal (p. 224) by Webb and Hughes of an outbreak of scrub typhus in Hong Kong raises a number of issues which I would like to discuss. During 1959 and 1960 over 120 adult patients under my care in the British Military Hospital, Taiping, Malaya, were investigated bacteriologically in considerable detail by the U.S. Army Medical Research Unit in Kuala Lumpur as well as being carefully observed clinically. The criteria for inclusion in this group were pyrexia and lymphadenopathy; it did not include cases of leptospirosis, though in a few of them co-existent viral or rickettsial infection confused the picture temporarily. The full details have not yet been evaluated, but in over 90 cases results of many tests are now available; these include Weil-Felix reaction (using OX K, OX 2, and OX 19 antigens), leptospiral hæmolytic test, Q-fever complement fixation test, murine typhus complement fixation test, dengue (group B virus) hæmagglutination inhibition test, and Paul-Bunnell reaction. In almost 100 cases the following diagnoses have been made: scrub typhus 37 per cent, Q-fever 7, group B virus infection 5, spotted fever group typhus 4, infectious mononucleosis 2, Siberian tick typhus (?) 1, and undiagnosed (" P.U.O.") 44 per cent.

Comparing the incidence of lymphadenopathy, splenomegaly, rash, eschar (found rarely), respiratory involvement and the results of white blood cell counts and morphology, and urinalysis, no difference is discernible between the scrub typhus and undiagnosed groups, nor is there any obvious difference in the clinical picture in these two major and the other groups. These findings, though still preliminary, throw, in my opinion, great doubt on the value of attaching diagnostic labels to diseases of which, in the light of modern virology, we know very little, and certainly far less than we thought we knew a few years ago. For all practical (i.e. therapeutic) purposes all these patients might have been suffering from scrub typhus, but this approach alone would have precluded any further contribution to the study of these endemic infectious diseases. The diagnostic test for scrub typhus, the Weil-Felix reaction, was also found to be extremely fickle. Using the same antigen on different occasions, and even more often using two different antigens on the same samples, quite inconsistent results were obtained. This may well have accounted for some of the difficulties.

The purpose of this letter is to plead for fuller investigation, whenever possible. of "scrub typhus like" illness in the Far East (and "P.U.O." in general elsewhere) which in many cases is not due to R. tzutzugamushi but to other rickettsial or viral agents, in many cases still undiagnosed. This need not in the meantime influence treatment, for what looks like scrub typhus ought to be treated as such. The fortunately rare attitude that a physician's ability is inversely proportional to the number of cases of "P.U.O." discharged from his wards, if it still exists, ought to be deplored. At the same time the unsatisfactory nature of the laboratory diagnosis of scrub typhus should, one hopes, soon lead to some improvement of the techniques used.

DEPARTMENT OF MEDICINE, THE GENERAL INFIRMARY, LEEDS, 1, YORKSHIRE. 15th January, 1962.

Yours faithfully,

R. S. KOCEN.



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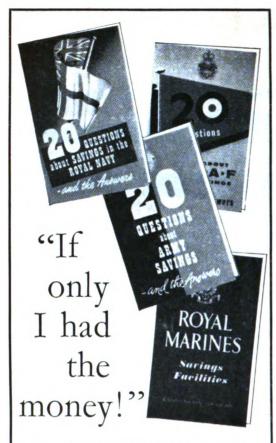
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BOOK REVIEWS

An Introduction to Anæsthetics. JOHN D. LAYCOCK. Lloyd-Luke, London: 1961. Pp. 132+vi. 10s. Although the Army Medical Services provide full specialist cover for anæsthetics wherever major surgery is undertaken, every Medical Officer should be prepared to administer a simple "general anæsthetic" in an emergency. The only way to learn to do this is to practice under the supervision of a specialist. A certain minimum theoretical knowledge, however, is essential, and this is provided by this well produced little book.

It explains and discusses the theory and management of general anæsthetics and their complications, provides the essential pharmacology of the required drugs and in general gives a good introduction into the outlook, scope and problems of the anæsthetist. The maximum dose of cocaine for surface analgesia is given on p. 113 as 10 ml. of a 10 per cent solution. This is surely a misprint and should perhaps read 2 ml. of a 10 per cent solution.

S. O. Bramwell

Cholera: Its Pathology and Pathogenesis. S. N. De. Edinburgh and London. Oliver and Boyd Ltd. 1961. Pp. ix + 141. 25s.

Since epidemic cholera is still prevalent in Asia, this monograph by a noted pathologist will be of interest to all medical officers in the Army. There are chapters on the history of cholera, its ætiology, pathology, the process of infection and on the cholera toxin. The pathogenesis of the disease is fully considered together with an account of the author's own ingenious experimental work in rabbits. Readable and well illustrated, this volume can be recommended especially to physicians and pathologists.

W. R. M. Drew

Basic Nursing Education Programmes. A guide to their Planning. KATHARINE LYMAN. W.H.O. 1961.

Pp. 81. Available from H.M. Stationery Office. 5s.

This is a practical guide to international nursing advisers, faced with the problem of assisting local nurses in countries where nursing education is developing. A very wide field is covered in little space, but clear tabulation adds much to the book's value. The first section sets out in a series of 196 questions, many of them multiple, the fact finding which would have to be a preliminary to planning. A pattern of nurse training suitable to the community must be established, rather than any attempt to impose the standards of other and different communities. The second section covers various aspects of the school itself, such as the planning committee, accommodation, teaching staff, recruitment, selection of students and general plan of instruction. This book is interesting to those concerned with the training of nurses, and most useful as a concise and factual guide to anyone acting in an advisory capacity to a new school of nursing overseas.

M. M. Trood

Medicine and the Navy, Volume III. (1714-1815). C. LLOYD and J. L. S. COULTER. Edinburgh and London. E. and S. Livingstone Ltd. Pp. ix +402. 50s.

Great Britain's maritime supremacy in the 18th century inevitably had its influence on the evelopment of medical practice in this country. Following the success of the first two volumes with their general and chronological approach, the publication of this third book dealing with several subjects is a landmark in the History of Medicine. The work is divided into four section Section I consists of chapters on the various types of staff serving in the Medical Department and the conditions in which they performed their duties; Section II deals with relevant aspects of the wars of the period; Section III covers the foundations of the great Naval Hospitals and their administration while the last section describes the practice of marine medicine and surgery. Written in a lucid sple carefully annotated and well illustrated, this volume, again sponsored by the Wellcome Trustee is assured of a good reception.

W. R. M. Driv

Expert Committee on Malaria. Eighth Report (W.H.O. Technical Report Series No. 205) 1961. Pp. 50. Available from H.M. Stationery Office. 3s. 6d.

In the two years which have elapsed since the publication of the Seventh Report (No. 162 in the series) much valuable information on malaria eradication has been collected. No notable change in the principles and techniques of malaria eradication are proposed, but the opportunity is taken to review the progress which has been made and to discuss in detail the causes of the occasional failures which have occurred. The report includes a brief review of recent work on simian malaria and its possible effects on the epidemiology of human malaria, and indicates the points on which further research is required. The present publication maintains the high standard set by preview reports and will be welcomed by all who wish to keep abreast with recent developments in this important subject.

W. M. MCCUTCHEON

A Short History of Clinical Pathology. W. D. FOSTER (with a chapter by S. C. Dyke). Edinburgh and London: E. & S. Livingstone Ltd. 1961. Pp. 154. Illustrated. 27s. 6d.

This charming book is quite exceptional in the history of medicine, for it really breaks fresh ground. It has been lavishly provided with good pictures by a benevolent publisher, and yet is not dear. It intriguingly lays out the development of many of the tests we take for granted, and has some good biographies of little-known men. It would make an excellent present for a doctor.

D. G. SARGANT

Smallpox. C. W. Dixon. London. J. and A. Churchill Ltd. 1962. Pp. vii+512. 130s.

The publication of a volume devoted to all aspects of smallpox by a former W.H.O. Consultant on the disease is an important event. It covers the needs of the epidemiologist, hospital admirstrator, clinician and pathologist and on the occurrence of an epidemic it will be invaluable. The work is well produced and will contribute to a better understanding of the many problems involved Its appearance is as important as that of the classical account by Ricketts and Byles in 1908.

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All papers intended for publication must be submitted in original type-written copy, double or triple spaced, on one side of good foolscap with generous margins, fully corrected. Any paper not up to these standards may be returned. Authors whose material is based on Service experience are reminded of *Queen's Regulations* (1961), para. 680, and are asked to send a copy to the Editor at the same time as writing to PR 1 (a).

There is no set style, but all abbreviations must be avoided. Contributors are on the increase and, with constantly rising costs of production, their papers must be brief. Papers are accepted on the understanding that they are subject to editorial revision, including alterations to condense or clarify the text, and omission of tables or illustrations. Titles must be brief and, if possible, attractive. Lists of References must be on a separate sheet, in alphabetical order, and limited to those mentioned in the text, where they should be in the form "Makewater (1962) observes . . ." or "(Makewater, 1962)." The Harvard system for bibliography is recommended and abbreviations must be according to World Medical Periodicals, 2nd Edition (1957).

The main author of each paper will receive a proof, which should be corrected and returned to the Editor swiftly. The submitted typescript is assumed to be ready for printing without further alteration. Allowance is made for reasonable corrections; unreasonable corrections may be disallowed, or charged to the author. An author who subscribes to the *Journal* may have on request up to 50 reprints free, divided between the authors of a joint paper.

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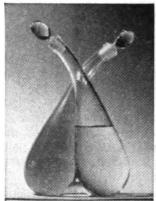
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A GENERATION STILL LOST?

FRICTIONS between doctoring and soldiering have ensured that the medical services of the Army have been a source of almost continual controversy since before the Crimean War. Though it is by now a cliché, it remains a nearly unattainable ideal, that an Army doctor must master and balance two professions whose aims and methods so often conflict. Since World War II about two-thirds of the men qualifying in medicine in this country have spent two years or more doing National Service, the majority in the Army. The horrifying fact that so many as one-third of these young men, fit enough to survive a long course of training, the rigours of examination and latterly the strain of junior hospital posts, should then be found unfit to serve Her Majesty is a reflection on the medical profession and its attitude to the Services which demands careful inquiry and honest recognition by the Defence departments. But National Service especially as it affects doctors has rarely been discussed in public, let alone properly investigated and squarely faced. The terrible consequences of the Army's short-sighted approach to it began to become obvious last year even to the stupidest, in the shape of a manpower and recruiting crisis falling as badly on the R.A.M.C. as anywhere. It is incredible how the War Office managed to realize so late what were to be the results of ending conscription, a political decision taken five years before. Advertizing remained at a lamentable level, there was no fresh approach to recruiting, and far from any steps being taken to refill the soon-to-be-decimated ranks of general duty, the last few years have seen slightly pathetic attempts to boost the specialist. The wisdom of this step as it may affect the Army's health can appear only in time, but it is doubtful whether it has much enhanced our prestige. Worst of all it has ensured that when the last conscript goes the specialist cadre is likely to be up to 90 per cent of its establishment, whereas the administrative and general duty strength will stand at a ludicrous 10 per cent. Recruiting to date has done nothing to stave off this position, very dangerous though it is to the R.A.M.C., the Army, and the country.

The British Medical Association has often come to the help of the R.A.M.C. in its recurrent crises, and the Corps is certainly not as grateful as it should be to that body for bringing it to birth. In the present crisis the efforts of the Armed Forces Committee have availed little and have in several ways made a disastrous situation even worse. A year ago we explained how the B.M.A. were trying to better the pay of conscript doctors. This was important and worth pursuing, even though a side issue. It is still possible that if the National Service doctor were given a fairer deal, less public money might need to be spent in overcoming the widespread anti-Army feeling in the younger half of the profession. The B.M.A's. approach to the Ministry of Defence last spring was so useless that proper relations were not resumed between them until the end of the year, and the British Medical Journal whipped on

¹J. roy. Army med. Cps. (1961). 107, 62. ²Brit. med. J. (1961). 2, Supplement, 28.

an already lively correspondence³ on National Service medical officers' pay with an annotation⁴, "The Minimum Necessary."

When pay increases for regular Service doctors were announced in May, 1961, the B.M.J. greeted them as too small⁵ and rather peevishly took the Ministry to task for not consulting the B.M.A. before announcing them. In the ensuing correspondence⁶ the Royal Air Force was characteristically to the fore, and the Chairman of the Armed Forces Committee, Air Vice-Marshal Stanbridge, announced⁷ that "the three Directors-General of Medical Services were being invited to B.M.A. House for discussions on how to overcome the serious shortage of medical officers." This was reported in the national Press although these three gentlemen had not yet been sent any such invitation.

The recently retired Director of Psychiatry, War Office, then revealed the workings. ineffective though they were, of the Knott Committee, set up by the War Office in 1959 to study the serious shortfall in recruiting of both officers and other ranks to the R.A.M.C. The Times immediately raised the controversy from a professional to a national level with a leading article stressing the indispensability of medical officers in fighting units and stating that "unless something can be done quickly to reverse the trends, serious cracks will begin to open up next year in the medical structure of all three Services." The Times could only hope that the pay increases of May might bring results, that further integration might be possible and that the Ministry of Defence would seek the B.M.A's. help "in finding a solution to as serious a single recruiting problem as has so far emerged." This alarm signal brought a correspondence which only lasted a few days, perhaps because in mid-August everyone was on holiday. There was no hope that any remedy could include a further pay increase and The Times did not mention this, presumably because before the holiday Mr. Lloyd's pay pause had been announced. Apart from the remark, original so far as we know, from a National Service doctor that the R.A.M.C. was "the finishing school of Trinity College, Dublin," very little emerged from The Times' initiative.

Letters in the *B.M.J.* were becoming increasingly emotional, rebellious and therefore, presumably, anonymous. The climax was reached with a letter from 'M.O.'¹⁰ which added to previous complaints of poor medical opportunities and restrictive militarism the paramount point, justified it would seem by events, that the "Top Brass dead wood" would be unable to bring in any useful reform. 'M.O.' ended on a venomous note: "I cannot echo the cry of several of your previous correspondents to the effect that I would not encourage my worst enemy to join the Medical Corps—I suspect he is already in."

Up to this point the R.A.M.C. and the other Services had suffered some pretty deplorable though mainly accurate publicity. Alas! It was from now on that some

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<sup>3</sup>ibid. (1961). 1, Supplement, 17, 39, 66, 86, 114, 133, 198, and 2, 104. 

<sup>4</sup>ibid. (1961). 1, 1161. 

<sup>5</sup>ibid. (1961). 1, 1599. 

<sup>6</sup>ibid. (1961). 1, Supplement, 314, 325, and 2, 30, 104, 120, 127, 129, 134, 137, 146. 

<sup>7</sup>ibid. (1961). 2, Supplement, 57. 

<sup>8</sup>ibid. (1961). 2, Supplement, 123. 

<sup>9</sup>The Times (1961). August 15. 

<sup>10</sup>Brit med. J. (1961). 2, Supplement, 134.
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of the Corps' heavier brass was rolled up to reply, and some even poorer publicity was the result. The young men who, considering the poor treatment meted out to them, complained reasonably enough of their lot were castigated as "querulous," "fatuous," "jejune," "callow"; their anonymity and idealism were cynically sneered at, and they were offered jingoism and a stuffy, even arrogant, complacency over the supposedly splendid state of the R.A.M.C. Shortcomings were only grudgingly admitted, and to a disinterested onlooker (or potential recruit) it must have appeared that the R.A.M.C's. man-management was almost as unimaginative as that of the National Health Service. This lack of comprehension between the views of older and younger officers is by far the most alarming feature revealed in the present crisis. Although it can hardly be new, it is bound to militate against the effect of any administrative reforms. Unless the older generation can show themselves more sympathetic towards youthful aspirations, the most high-powered recruiting campaign is likely to fail in its appeal to the National Service generation. A completely fresh attitude must be adopted, or a fatal break in manpower, morale and tradition will be counted among the later consequences of conscription.

SETTING AN EXAMPLE

THE Royal College of Physicians of London have taken a surprising step into the modern world with their report on smoking and health. It has made a deep impact on the public, and doctors especially will feel the irony in the point that the College last entered the arena with a campaign against London gin-drinking in the early 18th century. Many more doctors seem to have stopped smoking cigarettes since the report appeared, and in the R.A.M.C's Headquarter Mess at Millbank sales have fallen drastically. In view of the horrifying figures which we reviewed in our last number (Journal, January, p. 1) revealing that more than 80 per cent of soldiers are regular smokers by the age of 18, what has the Army done so far?

For some years it has been the policy concerted between the directors of Army Health and Education to dissuade those not yet fixed in the habit of cigarette smoking, especially enlisted boys, junior leaders, bandsmen and overseas school-children, and with hardened smokers to make the facts known. For this purpose all educational and medical officers received a brief based on the Medical Research Council review. What may actually have been done in the way of health education is unknown. It is not of course sensible to ban smoking except on a few obvious occasions like parades or lectures. Now that the Ministry of Health has undertaken more definite measures, the Service departments cannot lag behind. Public opinion may not long remain as receptive as it is at the moment.

Doctor Horace Joules has pointed out¹ that the Services should consider replacing the issue of duty-free cigarettes by some better welfare. The Admiralty said that their Medical Director-General was already reviewing the matter. Soldiers on active service are given 50 cigarettes a week completely free, let alone less tax, and it is still possible to buy cigarettes handsomely marked with the crest of the Royal Army Medical Corps. The Army must be able to offer better than this.

¹The Times (1962). April 5.

REPORT FROM TSHIKAPA

Captain R. A. THOMPSON

M.B.E., M.B., R.A.M.C.

(Late Ghana Army)

OUR Ghanaian battalion moved to Tshikapa in Kasai Province of the Congo during October, 1960. The area was an isolated one about 180 miles from the nearest other unit at Luluabourg, the capital, where Indian forces had set up the base hospital. There was no question of having to live under field conditions: the troops were accommodated in permanent buildings with running water, flush latrines and other modern coveniences. Casualty evacuation was by air as the roads were bad, and for the less urgent cases we had established a medical reception station of about six beds where patients were kept for three to four days, and which was never full. Supplies for military medical requirements were adequate, for earlier in Leopoldville we had supplemented battalion supplies by requisitioning the contents of the bathroom medicine cupboards in the houses we occupied. When the United Nations military medical supply depot opened, we used to obtain drugs from them and the situation improved.

The sphere of influence of the civil administration was an area within 60 to 100 miles' radius of Tshikapa, and was estimated to affect nearly 200,000 people. The medical services had been in abeyance since the end of July when, because of fierce inter-tribal fighting, virtually all the European doctors and medical personnel had left. The Congolese administrator was interested only in the political situation, and had neither the inclination nor the ability to attempt reorganization of the medical services. Attempts to do anything were continually bedevilled by lack of understanding and the lack of good faith between various tribal factions. The administrator and his immediate aides were Luluas, and while the other three tribes, the Balubas, Bampiendes and Batchiouks, got on well together, they did not get on with the Luluas. The preventive medical services had at one time included insecticide spraying, compulsory immunization programmes and regular prophylactic arsenical injections against trypanosomiasis. Each adult had to carry documents, one being his health certificate, which had to be signed by a medical officer at regular intervals, and especially when he moved from one area to another. There were also a number of hospitals. The main income for the district came from the Belgian-owned diamond mining company, which had its head office in Tshikapa. They ran three hospitals and a number of dispensaries, catering in normal times for 10 to 15,000 workers as well as non-workers, for whom they debited the Government. Two of the hospitals had been abandoned, one being completely sacked, and the other, in Tshikapa, having much equipment destroyed or stolen. The third hospital was working at a much reduced scale, and was in the charge of a Belgian agent sanitaire, a non-medical person with six months' to a year's training in preventive medicine. There were three Government hospitals, each without a doctor, and with a reduced nursing staff. One was at Sami, a village just outside Tshikapa in a predominantly Lulua

area, and was run by a Congolese nurse with one to two years' training assisted by four or five Lulua nurses on loan from the mining company. The man in charge would do all the diagnosis and treatment of medical cases and performed operations such as circumcisions, setting fractures and extracting bullets. They were able to indent for food and provided one meal a day for patients which consisted mainly of starch, although sometimes it included a little meat or fish if the nursing staff had bothered to obtain them. Most of the patients supplemented their diet by bringing in their own raw materials and cooking utensils, and consequently the compound often bore the look of a market. There was a large stock of dried milk and enough drugs to last for a few months. Theoretically the staff could indent on the central Government Pharmacy at Luluabourg for more supplies, but the senior official complained that his indents were never fulfilled. The staff were paid regularly, except for the months of October and November when the local Government treasury ran dry, and in this respect they were better off than the nursing staff in other more distant Government hospitals.

To the south of Tshikapa in Batchiouk territory was another hospital run by one nun with three Congolese nurses. Before the troubles there had been a doctor, three nuns and eight Congolese nurses, but now the remaining nun, who was a trained midwife, also acted as obstetrician, physician and surgeon. She was unable to provide food for the patients, or staff to look after them at night. As a result there were very few in-patients, while between 300 and 400 out-patients were treated daily. The stock of drugs was adequate for about six months, as like most outlying hospitals they used to obtain their supplies once or twice a year, but it was uncertain whether any further requisitions would be met. The nursing staff were unhappy as they had only received one month's pay since July, and all attempts to obtain money from the administrator had been met with evasiveness or regrets that there was none. My efforts in the same direction met with equal lack of success, but as they did not seem ill fed or clothed, one must assume that they were supported by friends or relatives. The third Government hospital was about 50 miles east of Tshikapa in Bampiende territory. Although it was well equipped with about 100 beds the staff had been reduced from a doctor, three nuns and six Congolese nurses to one nun who performed the obstetrics and midwifery. Operating was confined to the absolutely necessary. The nurses, while still at their posts, were less confident and enthusiastic, for they had been unpaid since July. They talked of striking just before I left, but I felt this would have made no impression on the civil authorities. There had been a custom of collecting the equivalent of 1/6d. from each patient for a course of treatment or a visit to the hospital, and this had been kept up. They had collected £40 which would normally have been sent to the provincial treasury, but being reluctant to do this they asked my advice, since it was insufficient to pay them all, even for one month. I advised them to keep it, even if only for the time being.

What help we were able to offer was directed to exisiting hospitals, and the more important and productive field of preventive medicine was left untouched. There was only one civilian doctor in the area, a Spanish employee of the mining company, who confined his activities to looking after the remaining European employees and a few hundred Congolese employees, mainly Luluas. He was unable to visit the

mining company hospital at Tshikapa which had been a well organized and equipped hospital of about 300 beds, with the services of two doctors, two agents sanitaire, three nuns and about twenty nurses. It had been the scene of trouble during the disturbances, when much equipment was stolen or destroyed. Being in the Baluba area of the town, the Baluba nursing staff refused entry to the European staff, who withdrew taking most of the important drugs with them and leaving only such things as oral enzyme preparations, laboratory reagents and a variety of gynæcological preparations. When we arrived in October there were only a few unenthusiastic Baluba nurses who came in daily. They were almost without medical supplies, and treating patients was more than they had bargained for, although they were intelligent and some of the most knowledgeable nurses I had met in Kasai. about 40 in-patients occupying about one and a half wards and all looked in a bad state of health, while a few were in extremis. In addition the hospital was in an appalling condition. The wards were unwashed with patients lying on the floor, used bandages and dirty dressings lay around, and blood stains could be seen in the empty maternity ward. The hospital compound was unswept and was littered with rubbish. Along the corridors were broken beds and torn mattresses, and anywhere you were liable to find deposits of excreta.

This was my first contact with the civilian medical problem, and the first task was to get the hospital working again. The nursing staff had a change of heart, and were ready to work under my direction or for anyone, if there was a chance of being paid regularly. The place was cleaned, and seven wards and the maternity unit were re-opened. An eighth ward was opened later when there were too many children for the two children's wards, and eventually there were about 300 in-patients. I asked the mining company what their intentions towards the hospital were, and although the staff were ready to accept their authority and were able to provide security, the company were unwilling to take it over, for they were losing money and could not afford to re-equip and re-staff. They consented, however, to my using the buildings and the remaining facilities, which included an X-ray machine, a sterilizing apparatus and some laboratory equipment. When things showed signs of returning to normal their doctor did agree to work with me, and they agreed to pay a number of essential staff. The question of drugs was difficult for such items as antibiotics, anti-tuberculous drugs, vitamins, and antimalarials were in short supply. The company were unable to supply us, for their stock was limited to use among their employees, and facilities for further imports were non-existent. The Red Cross provided enough for us to carry on for a couple of months, after which we borrowed drugs from outlying hospitals, and donated items such as aspirin and mepacrine, of which we had a surplus, from battalion medical supplies. Supplying food for all the patients was impossible and many brought their own raw materials and cooked for themselves. If a child was admitted, its mother came to look after it and would bring the smaller brothers and sisters. We did obtain some dried milk and fish from the Red Cross. and this was used in treating cases of kwashiorkor. Many of the mattresses had been stolen or torn, as had been the linen, leaving no hospital night suits, bed covers or theatre linen. All the staff could do was to make sure the patients had minor laboratory investigations, ensure they received treatment, and that the wards were reasonably clean. We also obtained a small stock of manioc and powdered maize, and provided meals for those destitutes who had neither the means to buy food nor the relatives to cook it for them.

Although our main endeavours were directed towards the restitution of the mining company hospital, I felt some encouragement should be given to the other hospitals and establishments working under difficult conditions. Their most serious handicap was lack of medical direction and I endeavoured to fill this by twice weekly visits to Sami and one visit a week to the other hospitals. My reception at Sami was restrained, and, as the weeks went on, although I was taken around the hospital, I was told less and less about the patients, whose language I could not speak. It may be that my lack of interest in surgery had not impressed the Congolese nursing staff, but my advice was seldom asked for, or seldom taken when given. After about six weeks I decided I was not doing much good there and did not go any more. There was also a settlement containing 3,000 Baluba refugees about 30 miles away at Mai-Munene. Although there was a dispensaire and a couple of unpaid Congolese nursing staff, it was well known to the Red Cross authorities that they were short of food and medicines, and they were supplied fairly regularly. There were many seriously ill patients, however, and these I also visited once a week.

The main diseases in this area were the direct results of malnutrition, principally kwashiorkor, but vitamin deficiences such as beri-beri, and eye changes attributable to vitamin A deficiency, were also common. A few cases of rickets were seen, but no scurvy, since there was ample fresh fruit in the district. Practically every case was complicated by malaria, mainly P. falciparum, and intestinal helminthiasis, particularly ankylostomiasis, with a resultant iron-deficiency anæmia. There was a high incidence of anæmia, but laboratory facilities for proper investigation did not exist and the hæmoglobin book comparator was the nearest thing to a hæmoglobinometer. Treatment consisted first of iron, and, if the response was poor, such other hæmatinics as were available. Filariasis was a common condition with loa-loa and onchocerchiasis predominating, and there were also many mango trees with the consequent following of mango flies. Tuberculosis was common, but the organization of treatment and follow-up, with screening of families and contacts, had been of a high order for a scattered rural community. The people in the Batshiuk area seemed particularly prone to tubercular infection, for out of some 350 patients attending daily, about 80 had tuberculosis, and if diagnostic facilities had been better, the number would have been much higher. I only saw three cases of leprosy, and there was a reasonable spectrum of other general medical and surgical conditions. Little obstetrics occurred, however, for few children were born in the hospital. Surgery was attempted solely in emergency cases and only local anæsthesia or haphazard general anæsthesia with chloroform was available. Toilet of compound fractures and cæsarean section also had to be performed on occasions.

It would have been impossible to do anything without the help of the International Red Cross. A Red Cross doctor from Luluabourg travelled to Tshikapa three times in three months before we arrived and visited the mining hospital and Sami. On the last occasion he brought a small stock of antibiotics, antimalarials and vitamins. Later, as the result of an urgent preliminary medical report, a Red Cross team, which in-

cluded an agricultural expert and a pharmacologist, came to visit Tshikapa. During a three days' stay they saw the medical and food problems as we had found them and promised to help with supplies and even possibly a permanent doctor. As a result we received regular dried milk, fish and farinaceous foods, but medical supplies and personnel were less easily forthcoming. Not until after a visit by the Brigade Commander, Brigadier J. E. Michel, and the Chief of Defence Staff, General H. T. Alexander, in early November did I obtain a moderate supply from the local provincial pharmacy. This lasted about two months, but a further indent had not been fulfilled by the time we left. I was unable to see the Liberian doctor who relieved me, but I left information about the civilian medical problems in the hope that he would do a little visiting. With the exception of Sami, I was always made to feel most welcome, and I regretted having to leave without being sure some medical direction would continue.

CONSTITUTIONAL

THE Journal Committee consists of the Director-General and the Commandant of the College, both ex-officio, as chairman and deputy, a pair each of serving, retired and reserve medical officers, and the honorary editors of the Army Medical Services Magazine and the Journal. It meets only twice a year and acts not as an editorial committee but as a committee of management, attending to matters of funds and circulation, both for the Journal and the Magazine. It takes no part in editorial work, which remains entirely the province of the editor and anyone he can persuade to help him. The status of the Journal rests on this basis alone. Our pronouncements are no more "official" than this.

SMALLPOX

From the Lettsomian Lectures for 1961 given before the Medical Society of London by

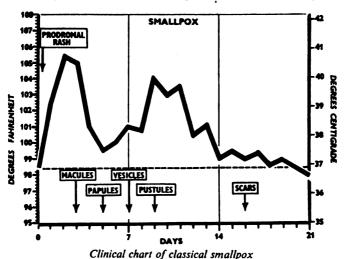
Major-General W. R. M. DREW C.B., C.B.E., Q.H.P., M.B., F.R.C.P., D.T.M. & H.

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PART II

THE classical descriptions of smallpox are those of Ricketts (1908) and Marsden (1948), but this present one is based largely on personal experience. First comes the invasive period, sometimes called the toxic or septicæmic stage, when after 10 to 14 days' incubation there is a sudden onset of chills, fever and rigors which may last as long as four to six days. The patient complains of frontal headache, low back pain and aching limbs. He becomes markedly prostrated, has a sore throat, husky voice and persistent cough, and vomiting may occur. The disease at this stage may easily be mistaken for epidemic influenza, typhus or pneumonia. Prodromal erythematous rashes may appear, especially in the axillæ groins and flanks; if the disease is fulminating, they may be petechial and even hæmorrhagic. The temperature may rise to 105° or 106° Fahrenheit, the pulse will be rapid and the face flushed. The conjunctivæ are injected, the tongue furred, and transient signs may be detected in the chest.

On the third or fourth day the eruptive or focal stage emerges when the general condition will have deteriorated, often with coma and delirium, and when the typical rash appears. Small deep-seated macules appear on the face, in the mouth and pharynx, and within a day spread down the trunk to the extremities. The macules in an area are all at a similar stage, the legs about a day behind the arms. As the eruption appears the temperature falls (see Fig.) and the general condition of the patient improves. Within a day the macules become papules, sometimes superficial but more





often deeply set in the skin, and after a further one or two days these papules vesiculate. The vesicles are raised, often umbilicated blisters, each surrounded by a pink areola of inflammation. If pricked or broken they do not collapse since they are loculated. Their colour is pink to grey and translucent, becoming opaque pustules a day later. These rupture first on mucous membranes and then over the rest of the body, except in thick skin, until they become covered with yellow, brown, or black crusts which, after about two weeks, tend to separate, leaving pitted areas as evidence of an attack of smallpox.

Distribution of Rash

Sydenham first pointed out that the rash is most profuse on the face. By tradition the attack is described as confluent when the lesions fuse; there is usually enough swelling for the face to lose its expression. Semi-confluent or discrete smallpox is commonly encountered. The rash is more marked wherever the body is subjected to pressure especially from clothes, and is therefore more profuse on the back than on the front of the chest and abdomen, less marked in areas like the side of the neck and supraclavicular regions, while the axillæ and groins are usually spared altogether. The eruption is more copious on the upper than on the lower extremities, being more marked on the extensor than on the flexor aspects of the limbs. It is always more marked on the back of the wrists than on the front. Lesions on the palms are more frequent in manual than in sedentary workers and are deeply embedded in the thick skin. Desquamation and pigmentation may also be present. The feet are similarly affected, with more pocks where pressure is greatest, so that the density of the rash will be governed by congenital deformities, types of footwear and walking habits. Like those on the palms, lesions on the soles are like deeply embedded seeds which take long to ripen.

Other Forms of Smallpox

Among the most malignant forms of the disease is hæmorrhagic smallpox, which is characterized by hæmorrhagic pustules, generalized purpura and bleeding from the mouth and other orifices. Past vaccination may modify an attack to the extent that the skin lesions are few or absent altogether. On the other hand smallpox in an individual who is only partly protected by previous vaccination may be moderately severe with a widespread distribution of the rash. When the pustules have ruptured, the weeping surfaces become covered with scabs. As healing proceeds the scabs separate, usually on the face, trunk and limbs, in that order, leaving typical scars which tend to become less disfiguring over the next year or two.

Not all peoples are equally susceptible to smallpox, and it is common experience in the Services for the disease to be mild in Africans, Indians, Malays and Chinese. Perhaps it is because of our familiarity with European patients that the rash seems to be less evident when the skin is pigmented. This also applies to patients in whom the features are disfigured. In spite of the wearing of less clothing, the eruption is more pronounced on the back than on the front of the body, but with the same centrifugal pattern of distribution on the limbs. In some of these patients the evolution of the disease from above downwards is easily recognizable on the limbs, and

"seeding" of the palms and soles is still a well marked feature. As in the European, the sheltered axillary and inguinal regions usually escape with few focal lesions. In children of these races one sees all extremes of the disease from a relatively inconspicuous rash with little constitutional disturbance to typical smallpox. Characteristic discrete smallpox may be seen in neonates protected by antibodies from the vaccinated mother. They have the disease in modified form, but it is not unusual to see a florid attack in children of a year or more.

Diagnosis

The diagnosis of possible smallpox must never remain in doubt for long and the proper steps are to seek the aid first of a physician experienced with the disease, and then of a competent virologist. In my own experience early notification to the Ministry of Health is both wise and rewarding. In taking the patient's history, association with the disease, recent arrival from overseas, or contact with a laboratory are suggestive. In the first few days, even if prodromal rashes are absent, the severity of the initial symptoms, such as pain in the back and prostration, is important. In the severe hæmorrhagic form the patient may at the outset die of an illness easily mistaken for acute leukæmia or acute fulminating meningococcal septicæmia. When the typical rash has appeared the character of the lesions, though all at more or less the same stage of development, is less significant than their centrifugal distribution. The presence of any lesions on the backs of the wrists, palms or soles is good evidence in favour of smallpox. Atypical cases are common and it is in persons partly protected by vaccination that the greatest difficulty arises, since the illness may be mild and the eruption scanty. A localized or generalized rash accompanied by fever is rarely a feature of vaccinia following vaccination. The rash will appear a week or so after the patient has been vaccinated. Encephalitis is an exceptional complication of vaccination.

The final diagnosis must always remain with the laboratory. In the early stages culture of the virus from the blood and its subsequent identification gives reliable results, while estimation of antigen in the patient's serum is also a useful procedure, especially in those who have died early of fulminating smallpox. Later in the illness, material obtained by scraping the focal skin lesions can be cultured on the choricallantoic membrane of the developing chick embryo. The small discrete white hæmorrhagic lesions are distinctive in contrast to those of vaccinia and varicella. After the first week antibodies can also be demonstrated in the patient's serum, but this is not diagnostic if the patient has been vaccinated within a year. The practical point is that the virologist will give a firm diagnosis within a day or two of receiving suitable specimens.

In both civil and military practice the differentiation between chickenpox and smallpox is difficult. Generally chickenpox is a disease of children and smallpox is seen in adults. Chickenpox is characterized by the centripetal distribution of skin lesions which are superficial, unilocular and tend to appear in crops. In smallpox they are deep, multilocular, often umbilicated, and all at the same stage of development. Lesions greater than 1 cm. in diameter suggest the more serious disease, and except in smallpox it is unusual to find seeds in the palms and soles. Experience

in the Middle East has shown that in Europeans, the illness accompanying chickenpox may be so severe and the rash so widespread that it is readily confused with
smallpox. In West Africa this latter disease is encountered in relatively mild epidemics,
and it is not rare for the two diseases to occur concurrently. In the Far East chickenpox
in Malays and Chinese tends to be severe, some of the lesions may be umbilicated
and some may be found on the palms and soles. In contrast with this experience
smallpox in these races often tends to be mild and inconspicuous even in the unprotected patient. The vaccination state may also help in diagnosis, for successful
vaccination within two years is evidence against smallpox. Drug rashes, especially
those due to barbiturates and bromides, may sometimes be mistaken for smallpox, and
Kaposi's varicelliform eruption, which is probably due to infection with the herpes
simplex virus in infants with eczema, may cause difficulty in diagnosis. Just occasionally the rash of disseminated lupus erythematosus may simulate smallpox.

Complications

The most frequent complication in my experience is sepsis, for abscesses, cellulitis and sloughing of the skin may occur, and paronychia may have a permanent effect on nail growth. In severe smallpox, even without sepsis, it is not unusual to see the epidermis shed as after a burn, and bedsores are commoner than in most of the exanthemata. Cockshott and MacGregor (1958) have recently drawn attention to the osteomyelitis variolosa that may accompany smallpox in children, in whom this complication may affect the elbow region. They believe that a primary infection of the metaphysis of the growing bone with smallpox virus is probably the cause of these skeletal lesions. Eye complications are important and formerly caused blindness. Vesicles on the conjunctivæ are common, and if neglected can lead to ulceration, spreading keratitis and sloughing of the cornea. Fortunately encephalomyelitis, leading to permanent damage of the nervous system, is now a rarity.

Prophylaxis

Vaccination is the most important routine measure against smallpox. Primary vaccination in infancy and successful re-vaccination every three years gives reasonable protection. In an epidemic re-vaccination, preferably using a multiple pressure technique, should be undertaken without delay. Dried vaccine lymph, which is reconstituted with distilled water, has now replaced glycerinated calf-lymph, because it is stable, especially in the tropics. Local, national and international notification is compulsory. A patient suspected of smallpox must be strictly isolated, and contacts are quarantined and examined daily for 16 days. All contacts should be vaccinated immediately and a few hours later should be given by injection 1.0–1.5 Gm. of antivaccinial gamma-globulin. Larger doses of gamma-globulin can be safely given, but if it is in short supply, preference should be given to those contacts with a doubtful vaccination history. Downie (1959) has cast doubt on the value of vaccination in contacts, even within one day of exposure to smallpox. It is agreed that passive immunization with gamma-globulin can never give results as satisfactory as successful vaccination before exposure.

Treatment

In man the virus is unaffected by any known treatment, but in experimental animals Bower and Sadler (1960) have reported promising anti-viral effects with one of the thio-semicarbazones. First-class nursing care of the patient is especially rewarding and in confluent smallpox it enables the eyes and mouth to be kept clean and free from heavily encrusted lesions. Care of the back will diminish the danger of bedsores, but except to reduce irritation I have found that local applications to the skin are of little value. The use of ointments containing neomycin and corticosteroids are under trial. Chemotherapy with sulphonamides, penicillin or the tetracyclines to prevent skin sepsis and scarring is not as promising as anticipated, but it does lessen the severity of all pyogenic complications.

Conclusions

The aim of these Lettsomian Lectures has been to draw attention to the ever increasing rapidity with which the gap between tropical and temperate medicine is being bridged by air travel. It may be just as necessary to be familiar with cholera and smallpox in London today as in Calcutta. In the event of a world cataclysm, is it not possible that some of these old forms of pestilence may return and plague us all?

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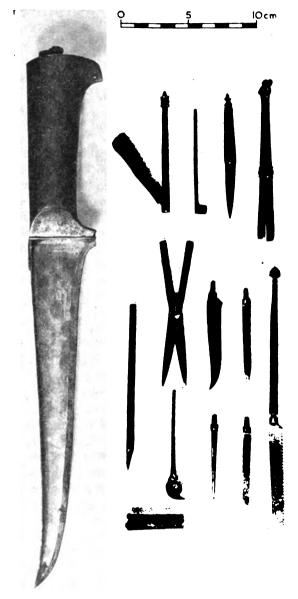
MUSEUM NOTES

THE Corps Museum has received a notable addition in the shape of a large number of relics and documents relating to Sir John Hall, who was Lord Raglan's principal medical officer in the Crimea. These include his sword and cocked hat and several elaborate certificates recording his attendance in various schools of anatomy, physiology, etc., including one from the Hunter's famous school in Windmill Street. Among a mass of reports, newspaper cuttings, pamphlets, and so on are five small notebooks in which he kept his personal diary. The two dealing with the Crimean War are of almost intolerable poignancy. As a north-country farmer's son he had no special advantages in wealth, breeding or education and attended Appleby grammar school before going to St. Thomas's and Guy's. At the age of 59 he finds himself suddenly transferred from India to the chaotic muddle at Varna base. As a member of a civil department he is confronted by a collection of wealthy, irascible old aristocrats completely ignorant of the elements of hygiene and logistics who ignore his recommendations with the result that the Army is plunged into a raging epidemic of cholera. Almost at the end of his tether Dr. Hall writes "my position is one of utter misery, better dead than exist thus." "His Lordship [Lord Raglan] pounces on a solitary instance where he thinks the medical department is concerned to chime in with the newspaper cry that has been raised against it " and " Would that I had never come here. To be fettered as I have been by helpless people in every department under me is enough to drive one mad—and now the whole blame will fall on me."

We have lately been given a Sikh fighting knife or kirpan, which has a veritable "surgeon's chest" ingeniously stored away in its handle. The design of the knife blade derives from Khyberi tradition, as is indicated by the strong rib to the blade; the instruments were obviously made by a "daesi mistri" and the ornamentation is typically Punjabi. The accompanying photograph shows the knife and the number and variety of the instruments, which include lancets, surgical saw, forceps, and so on. The knife was picked up at Mooltan during the Indian Mutiny by the servant of a Surgeon Major Daniel Paterson Barry. It presents an intriguing problem. The crudely made surgical instruments are unlikely to have been used by a British Army surgeon, but, at the same time, it is difficult to envisage a war-like Sikh making a savage onslaught on his enemy and then proceeding to unscrew the top of his weapon to patch him up again! This interesting exhibit was presented by Mrs. M. Ryan of Okehampton, Devon, the widow of a grandson of Dr. Barry.

Freemasons will be interested to see the Founder's Jewels of the In Arduis Fidelis Lodge and Chapter. The memories of three greatly beloved officers, Colonels Frank Worthington, Martyn Davies and Dudley Buckley, will be kept bright by the addition of their swords to the "ladder of swords" which is a prominent feature of the museum, and we have received an elaborate sword of honour presented by the Sultan of Morocco to Deputy Surgeon General George Will, who was on the staff of Sir Drummond Hay, plenipo tentiary from 1872 to 1886.

R.E.B.



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Sikh surgical kirpan showing the surgical instruments contained in the handle, in relation to the knife itself.

ABDOMINAL INJURIES IN CYPRUS

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DURING the four years from 1955 to 1958, fifty patients with abdominal injuries were admitted to the surgical department of the Nicosia General Hospital. After a quick preliminary examination, the necessary X-rays were taken. The radiographs gave us an idea of the condition of the lungs, the diaphragm, the presence of bullets or other foreign bodies, fractures, and so on. With this and the position of entry and exit wounds, we could envisage how intra-abdominal structures might have been involved. We were never able to diagnose the presence or not of intra-abdominal hæmorrhage by radiology according to the method advocated by Rouhier (1953). Gas under the diaphragm was considered important even when clinical signs were slight.

Twelve hours after bullet injury in a young man there were very slight clinical signs, but definite evidence of gas under the diaphragm. Laparotomy revealed perforation of the small intestine at two points. These were sutured and the patient recovered.

The diminution or absence of liver dullness was of paramount importance in most cases with perforation of the gastro-intestinal tract. With general or local peritonitis, however, the value of this sign is naturally limited. An equally useful sign was the presence of peristaltic sounds to exclude generalized peritonitis. We found that in the first three to four hours after injury of the small intestine, bowel movements increase before gradually disappearing. This is very useful in cases of injury only to the abdominal wall or the retro-peritoneal spaces. The presence of peristaltic sounds six to twelve hours after injury of the retro-peritoneal space helped us to avoid laparotomy in two cases whose recovery justified our inaction.

Many factors contributed to these patients' fates: the nature, number and site of the injuries, the severity of shock and the available means of combating it, and so forth. Of the 50 patients, 34 were injured by a gun, 11 by other weapons, and 5 by shrapnel. In only 6 cases was there a single wound, while in the other 44 there were multiple abdominal wounds as well as injuries elsewhere. The stomach was injured in 8 cases, the small intestine in 14, the duodenum in 3, the liver in 14, the colon in 11, abdominal blood vessels in 7, the gall bladder in 2, the kidneys in 3, the spleen in 3, the urinary bladder in 2, the sigmoid colon in 4, the rectum in 4, the perineum in 3, the spinal cord in 3, and the pancreas in 1.

There was guerilla warfare in Cyprus and not field battle. Most shootings were in the towns or villages at close range and after careful calculation. Very rarely was there only one shot; often there were up to ten. Those who survived were transported from the town or suburbs usually within the first two to six hours, but from the

mountainous areas after 12 to 48 hours. This delay was conclusive, because to hæmorrhagic shock were added the effects of infection.

In a patient who had been shot and transported from Paphos (160 km.) within the first three hours by helicopter (the only instance), the shock was very slight, the abdomen slightly painful, the pulse 90/min. and the blood pressure 135/80. At immediate laparotomy it was found that despite the few clinical signs the small intestine was perforated at thirteen points. These were sutured and the patient recovered.

In a 13-year-old girl the clinical signs were slight, but laparotomy four hours after the accicident showed eleven holes in the small intestine and one in the cæcum caused by a bullet. These were sutured and the patient recovered.

The problem of transport of such cases is extremely important, but unfortunately in Cyprus we are much behind in this subject. Many came in vehicles without any medical treatment or aid, and it was really tragic that in some the very heavy shock on admission was not due to the trauma itself, but to the blood lost from their wounds during transport. Certainly the method adopted by the Americans in Korea, where people with abdominal injuries were left on a special stretcher from the time they were picked up until they were completely cured, was a factor in their better results, and this method was adopted later by the French in Algeria.

To combat shock is of paramount importance in the improvement of operative results in abdominal injuries. The French in Indo-China found that 57 per cent of post-operative deaths were due to shock. It is previous war experience that shock in abdominal injuries, unless they are multiple, is very slight in the first few hours. We quickly learned that heavy shock shortly after injury was due almost always to heavy internal hæmorrhage. The distinction is not always clear, but with increasing experience the patient with simple shock, in whom apathy is the most prominent sign, can quickly be distinguished from the patient with shock from internal hæmorrhage, in whom the marked anxiety and tachypnæa resulting from the loss of blood are most prominent. Following that principle we tried from the beginning to check post-traumatic shock. Morphia and 1,000 to 1,500 ml. of blood, preferably of the right group, were therefore given within the first two hours, and the patient was carefully observed and prepared for operation.

Irrespective of the depth of shock we never waited more than two hours. The usual post-traumatic shock generally improved, and there was then ample time for operation. If on the other hand despite attempts at resuscitation the pulse and blood pressure did not improve within the first two hours, it was more than clear that shock was due to internal hæmorrhage, and hence immediate operation was the only treatment. This regime has not disappointed us, because in a case of abdominal injury, with a systolic blood pressure below 60 mm. of mercury, hardly palpable pulse and hence anoxia of the internal organs, any delay would lessen the hopes of survival. In many instances when the hæmorrhage had been checked after quick laparotomy we had the satisfaction of hearing the anæsthetist, until now anxious, announcing a steady improvement in the patient's pulse and blood pressure. Certainly there were exceptions. Sometimes, despite hæmostasis and adequate replacement of lost blood, shock became worse and irreversible. In these cases there were usually multiple severe injuries of the abdomen, thorax and other parts, or in rare cases the original impression of the surgeon that he had stopped all hæmorrhage was wrong,



and it continued post-operatively with extremely disappointing results, as shown by autopsy in one of our cases.

Adrenaline and nor-adrenaline were used only in a few cases, because of reports of renal damage with these drugs. In two patients, however, nor-adrenaline was used with other methods for 30 to 48 hours to combat low blood pressure, and they made an uneventful recovery. We also had satisfactory results with intravenous hydrocortisone mainly in post-operative shock. The most important agent, however, in the treatment of shock is undoubtedly the replacement of the blood lost. The greatest amount of blood we ever gave was 7 litres. Usually 1 or 2 litres of blood were transfused in the first 48 hours. This amount is not excessive, and we do not think that the enormous quantities of blood given by the Americans in abdominal injuries in Korea was, as some French surgeons stress, the reason for their better results. In a patient, for instance, with ruptured liver who survived, the Americans had given 23 litres of blood in 24 hours! One may wonder whether such enormous amounts in a short time could be harmful.

Anasthesia. Almost all our patients had intravenous Pentothal, with Flaxedil or curare for endotracheal intubation and relaxation. The resulting relaxation allowed us to discover the injured organs swiftly. We preferred to pull the bowel gently through the incision by quick and systematic manipulations in order to ascertain the site and nature of the injuries, and rapidly to replace them in the peritoneal cavity. We do not believe that this manipulation increased shock. The technique allowed us to discover quickly perforations that might otherwise be difficult to find. and we were very satisfied to ascertain that not one of our patients, many with multiple perforations, was lost as a result of an undiscovered injury.

Operative Technique

In all cases we conformed with generally accepted surgical technique, respecting the tissues, fanatically trying to remove the least possible part of an injured organ, and not exposing the patient's life to unnecessary danger. We contented ourselves as far as possible with the physiological paths of opening the abdomen. A transverse supra-umbilical incision was extremely useful for through-and-through injuries of the upper abdomen. Wherever possible we sutured the perforations, and in only a few cases was bowel resected. In cases of perforation of the stomach, duodenum, and gall bladder, suture in two layers has been satisfactory. In 14 cases of perforation of the small intestine, with up to 13 perforations in each, simple suture was done in 8, resection in 5, and in 1 both. In 6 cases of large bowel perforation due to bomb explosions, when usually much bowel was destroyed, colostomy was performed while in 5 cases with bullet wounds of the colon suture in two layers gave a satisfactory result.

The treatment of liver injuries was the most difficult problem. At first we were satisfied with simple packing of the cavity. The first patient died 18, and the second 20, days later, having made satisfactory progress for a week, followed by jaundice and other signs of hepato-renal failure. Both autopsies showed all other injuries of the thorax, diaphragm and abdomen completely healed, but the hepatic cavity full of necrotic tissue. The pathologist gave as the cause of death the continuous absorp-

tion of toxins from this cavity. After that we preferred to adopt the same technique as in soft tissue injuries, i.e. where possible to excise necrotic liver tissue, effect hæmostasis, obliterate the cavity by sutures and drain it by a rubber tube. In one case, where apart from perforation of the stomach and transverse colon by a bullet there was severe damage to the left lobe of the liver, a hemihepatectomy was performed with satisfactory results. Of these 14 cases of liver injury 5 died.

Injuries of mesenteric vessels and omentum were found in 13 cases. In one an enormous retroperitoneal hæmatoma was found, and in another injury to the left gastric artery produced severe intraperitoneal hæmorrhage. We had two cases of injury to the kidney by bullets and one by a knife. In one the initial hæmaturia subsided, and in the other two the injury was repaired at operation without removing the kidney. The urinary bladder was perforated twice and the urethra ruptured once. In 4 cases of injury to the rectum, colostomy was performed with 1 death. This man appeared cured but developed severe septicæmia on the twentieth post-operative day, due to purulent arthritis of the hip joint where the bullet was impacted.

Post-operative Course

At the end of the operation crystalline penicillin and streptomycin solutions were put in the abdominal cavity. The wounds were sutured in layers. The patient's pulse and blood pressure were systematically observed for the first 48 post-operative hours, and normal saline or glucose and if necessary blood were given until normal physiological functions returned. The stomach tube was removed only when bowel sounds returned and gastric retention was normal. Antibiotics were used logically. Although some doubt the value of the routine use of antibiotics, we think that they are an excellent adjunct to a well-performed operation. Post-operative sepsis was negligible, despite the fact that the nature of such injuries favours its development. Some patients developed a rash which disappeared after stopping antibiotics and giving anti-histamines. Only one patient developed on the eighth day very severe diarrhæa from the colostomy, which despite rigorous treatment resulted in death on the twelfth day. Autopsy showed healed wounds of the stomach and intestine and severe ædema and redness of the intestinal mucosa, so we had to attribute death to the very rare complication of enteritis from the use of antibiotics.

Results

Of the 50 cases of abdominal injuries operated upon, 10 (20 per cent) died. Three post-operative deaths were due to irreversible shock, 1 to post-operative hæmorrhage, 3 to toxæmia, 1 to enteritis, and 2 to peritonitis.

Only in the Second World War, especially with the large-scale use of antibiotics, blood transfusions, improved anæsthesia and the establishment of operating theatres closer to the front line, did results show much improvement on a 60 to 80 per cent operative mortality for war wounds. This steadily persisted during the wars in Indo-China, Korea and Algeria. In seven surgical centres in Indo-China the mortality rate was around 41 per cent (Aulong and Caillard, 1956; Chippaux et al., 1956; Favre, 1958). In Algeria from 1955 to 1958 it was 22 per cent (Delvoye et al., 1958) and the Americans in Korea reduced it to the extremely low figure of 10 per cent

(Aulong and Caillard, 1956). This considerable difference in the mortality rate of the French surgeons in Indo-China and Algeria and ourselves in Cyprus on the one hand, and that of the Americans in Korea on the other, cannot be attributed solely to statistical variations. The French confess that the exceptional results of the Americans arose because they showed great care in the combat of shock and worked under extremely favourable conditions. The 46th American Mobile Military Surgical Theatre in Korea was only 16 km. from the front line, and all injured were transported by helicopter within the first three hours to that very well equipped operating theatre, with many surgeons of all specialities and all the modern medical aids at their disposal.

At first all civilian and police cases were treated in the General Hospital, Nicosia. Later, however, for reasons of security, the expatriates, Turkish policemen and others were admitted to 57 British Military Hospital on the outskirts of Nicosia. That hospital was very well equipped, both with medical and nursing staff and with technical equipment. There were two consultant surgeons, other surgeons of all specialities, and excellent anæsthetists, in contrast to our civil hospital with one surgeon, two assistants and two anæsthetists. For a long time it was impossible to find out the exact number admitted to the Military Hospital for security reasons. It was only when Colonel Watts, one of the surgeons at 57 B.M.H., gave a lecture at the Royal College of Surgeons in London in August, 1960, that we were able to learn the exact figures. Of 73 patients with abdominal injuries there were 8 post-operative deaths, a surgical mortality of about 11 per cent.

If we now try to compare our results with those in the literature, we should at once stress that a small number of cases may lead to erroneous analogies. Comparison of figures in abdominal injuries is specially difficult because, as is known, many factors such as method of transport, extent and number of injuries, adequate organization of the theatre, and adequate medical and nursing staff, play an important role in the final results. Our figures are valuable in the respect that, as we have mentioned, all the injured were operated upon, with few exceptions, by the same surgeon and remained in hospital under observation until complete recovery. The conditions under which we worked cannot be compared with those in Indo-China and Korea, where battles at close range took place, but rather with those in Algeria and especially the surgical department of Maillot Hospital, Algeria, and the Military Hospital in Nicosia, which, being in the towns, had to face the difficulties of a guerilla war as we did.

Summary

We have described the background, diagnosis and treatment of 50 patients with abdominal injury admitted to the surgical department of the Nicosia General Hospital in Cyprus from 1955 to 1958, and we have compared our mortality of 20 per cent with those previously published.

We are indebted to the Director of Medical Services of Cyprus for permission to publish this paper.

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X-IRRADIATION AND THE SECONDARY RESPONSE TO TETANUS TOXOID IN MICE

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In 1952 the Army Pathology Advisory Committee recommended that wounded soldiers who have been actively immunized should be given a dose of tetanus toxoid and not tetanus antiserum as had been the practice previously (Sachs, 1952). This policy depends for its success upon an adequate immunological response to a 'boosting' dose of tetanus toxoid. In the event of nuclear warfare, wounded soldiers are likely to have been exposed to irradiation and this may, as one effect, be detrimental to this treatment since irradiation is now known to inhibit antibody formation (Taliaferro, 1951).

Many investigations of the inhibitory effects of X-irradiation on the antibody response to primary stimulation with antigen have been carried out. Less is known about the effect of irradiation upon the secondary or anamnestic response to antigen though several studies have been reported (Dixon, Talmage and Maurer, 1952; Taliaferro, Taliaferro and Janssen, 1952; Silverman and Chin, 1954; Crosland-Taylor, 1955; Hale and Stoner, 1956). These workers used different in vitro methods and disagreed as to whether the secondary response was inhibited by irradiation or not. The majority found that it was inhibited but that the degree of inhibition depended both upon the dose of irradiation used and the time at which it was given relative to the secondary antigenic stimulus. In the past, conflicting results about the effects of irradiation upon the secondary response have arisen no doubt from the fact that different species and strains of animals have been used, that different antigens have been employed, and methods of determining antibody levels have differed both in sensitivity and accuracy. In vitro methods of determination of antibody levels do not necessarily reflect completely the immune state of an animal. A method more to be favoured in determining the state of immunity of an animal to tetanus is the actual challenge of that animal with a lethal dose of tetanus toxin. This method has been employed throughout this investigation.

In the experiments reported below mice were employed in large numbers and many replicate treatment series were used. The purpose was to randomize as far as possible the effects of uncontrolled variables including the variation in antibody response which occurs between animals injected with the same amounts of the same antigen (Oakley, 1953; Barr, Fulthorpe and Llewellyn-Jones, 1957). To investigate

more fully the influence of time of irradiation upon the response to secondary antigenic stimulation, irradiation was given from five weeks before the secondary stimulus to one week after it.

Method

Animals. Male mice of the crossbred PCT stock were used. This was the multiply-recessive stock used by Carter, Lyon and Phillips (1956). They received their first dose of tetanus toxoid when aged 42 ± 5 days and of average weight 20 Gm. The experimental unit was a box containing six mice.

Immunization. The mice were immunized with two doses of 0.5 ml. of crude formol tetanus toxoid, strength 8 Lf/ml., given subcutaneously over the back of the neck with an interval of six weeks between the doses.

Irradiation. The mice were irradiated at the following 12 intervals ranging from 35 days before the second dose of tetanus toxoid to 7 days after it:

-35 days, -28 days, -21 days, -14 days, -9 days, -7 days, -5 days, -2 days, -1 day +2 days, +5 days and +7 days. The irradiation was given from a 250 kVP Siemens Deep X-ray Therapy Tube operating at 14 mA with a half-value layer of 1.2 mm. of copper and a dose rate of 68.3 rads min. The mice were irradiated within their boxes and a filter was used to produce a uniform field over the area irradiated (Corp, 1957). Three doses of irradiation were employed during the investigation, 500, 350 and 200 rads.

Toxin challenge. Fourteen days after the second dose of toxoid the mice were challenged with 5.6×10^{-4} mg, tetanus toxin given in 0.5 ml, of sterile 0.9 per cent saline intramuscularly into the left thigh.

Method of assessing response to toxin. After challenge with tetanus toxin the mice were inspected daily for eight days. The number of dead mice was recorded and a note was made of all surviving mice showing evidence of the action of toxin, the criterion being the occurrence of muscular spasm producing paralysis, usually of the left or both hind legs. On the eighth day a final record of dead and paralysed mice was made, and the combined numbers were used to assess the inhibition of the immune response. The surviving mice were killed.

Experimental design. Eight experiments were carried out, each consisting of a series of repeats (replications) of the same treatments and associated controls. The first five experiments were regarded as preliminary and included from three to six of the timed irradiation treatments; only in the last three experiments were all the above-mentioned times of irradiation included. Each treatment group consisted either of one or of two boxes (i.e. 6 or 12 mice). Unirradiated control treatments were of two types, referred to as 'toxoid' and 'toxin' controls respectively. The former were immunized and challenged in exactly the same way as the irradiated mice; the latter were injected with saline instead of toxoid (i.e. were not immunized) but were challenged with toxin in the normal manner. The two control treatments therefore served to demonstrate the continued potency of the toxoid and toxin preparations employed.

Each replication began with the concurrent primary immunization of all the mice except those intended as toxin controls. Secondary immunization and challenge followed 6 and 8 weeks later respectively. The actual irradiations were spread over a period ranging from 11 days in experiment to 6 weeks in experiments VI to VIII. Including the 8 days to assess the effect of the toxin challenge each replication occupied 9 weeks and 1 day. Replications were started as soon as sufficient animals

were available and invariably overlapped in time.

The few exceptions to the rule that each treatment group within an experiment should consist

of an equal number of mice were as follows.

In experiment I there were 12 mice per replication in each control group (instead of 6). In experiment IV there were 6 mice per replication in each control group (instead of 12). Also, one treatment group of 12 mice was not irradiated at minus 5 days as intended and was included with toxoid controls. In experiment V there were 6 mice only in the minus 28 days treatment group in one replication. Experiments VII and VIII were carried out as one continuous series of 14 replications. In view of the negligible response to 200 rads., the dose was raised to 350 rads. while four of the replications were in progress. Accordingly, in experiment VII the later treatment groups contained fewer mice than the earlier treatment groups, while in experiment VIII the reverse was true. The maximum number of mice per treatment group in experiment VII was 48, and in experiment VIII, 60. The controls in all replications in which any treatment group received 350 rads. were arbitrarily allotted to experiment VIII.

Results

The experimental results are summarized in Tables I, II and III. Statistical tests based on the data of Table I are given in Table IV.

Deaths not attributable to toxin challenge. A few mice died or were otherwise lost during the experiments and more died as a result of irradiation. Details are given in Table II. Deaths attributable to X-irradiation occurred only in experiments I to VI, i.e. after 500 rads. whole-body irradiation. The time of death varied from 5 to 33 days after irradiation and some deaths in certain treatment groups took place after challenge with toxin. The latter were, however, clearly distinguished from toxin deaths by the absence of muscular spasm and by the characteristic post-mortem appearance. There is no evidence that the frequency of X-ray deaths varied appreciably as between groups irradiated before the secondary immunization. The mean percentage loss attributed to irradiation in these groups was 8.2 and the range 5 to 13. Fewer X-ray deaths were recorded among the groups irradiated after secondary immunization. The mean percentage loss due to irradiation in this series (+2, +5 and +7 days) was 3.5 and the range 2 to 5. This is not surprising since the time during which a death could be recorded was becoming progressively less, terminating with only 15 days for the +7 days treatment. There may also have been a small effect attributable to the age of the mice, which become somewhat more resistant to irradiation as they grow older. This effect was demonstrated in other mice of the same strain while the experiment was in progress. The LD₅₀, 30 days, for male PCT mice was found to be 593 ± 6 rads, when they were 84 days old (the time of the minus 35 day irradiation), but to be 673 ± 8 rads, when they were 84 days old (the time of the main experiment).

Deaths attributable to toxin challenge. The toxin controls showed 100 per cent mortality throughout the experiment (except one paralysed mouse, see Table I) and death invariably took place within 4 days with the greatest incidence on the second day after toxin challenge. Within 24 hours of the challenge of a mouse the muscles of the left hind leg were in continuous spasm, the tail base was drawn over to the left (the injection having been made in the left thigh), and there was usually early spasm of the right hind leg. By two days there was complete spasm in both hind legs, the mouse would develop tetanic spasm of the whole body on being handled, and death would follow rapidly. The toxoid control showed 13 deaths and 3 cases of paralysis. Deaths and paralysis occurred throughout the observation period with a peak on the third day. Deaths attributable to toxin in the immunized irradiated groups also had a maximum incidence on the second day after challenge, but a greater number occurred at a later period than in the toxin controls, i.e. on the fourth to seventh days. Many of the paralysed animals that were still alive on the eighth day had not exhibited spasm until the third or fourth day after toxin challenge. The spasm was often confined to the left hind leg only, though in some animals both hind legs were affected with complete limitation in movement.

Statistical treatment. The analysis of the raw data from the individual experiments showed homogeneity between replicates of the same treatments by inspection or by χ^2 tests. The data were therefore combined to give the figures presented in Tables I and II, from which the percentage responses shown in Table III were calculated. However similar comparison of the data relating to the same treatment in different experiments revealed significant heterogeneity, so that combination of the data obtained in different experiments was not legitimate. A series of tests of heterogeneity appropriate to the design of the experiments or suggested by the results are presented in Table IV. They were done either by the χ^2 method or by Fisher's exact method (Fisher, 1950) on the data of Table I.

Conclusions

A dose of 500 rads. of whole-body X-irradiation delivered at any time from 1 to 35 days before secondary immunization reduces the power of the animal to withstand toxin challenge. Although there is significant heterogeneity between these treatments in only 3 out of 6 experiments, the data as a whole (Table III) suggest a rise in the degree of inhibition of the secondary response as the time of irradiation approaches more closely to the time of secondary immunization.

The difference in effect of X-irradiation before and after secondary immunization is very striking and hardly requires statistical test. The data indicate an inhibition of the response when irradiation is given two days after secondary immunization, the effect being significant at the conventional 5 per cent level in two out of three experiments. By five days after secondary immunization the effect has almost disappeared, and by seven days is indistinguishable from the control level.

After 350 rads, the inhibition of the secondary response is very much reduced but follows the same pattern as after 500 rads. In the 200 rads, experiment there is no evidence of any inhibition at all.



TABLE I. Toxin deaths, cases of paralysis and numbers of mice at risk

The three entries in each cell give the number killed by toxin (left above), the number paralysed (right above) and the number at risk (below). The number at risk was the total number treated less X-ray deaths, and deaths and losses from other causes as shown in Table II.

•	二 ガノ	Repli- cations		F	ime of ir	radiatio	n; days t	Time of irradiation; days before or after secondary immunization	after sec	ondary i	immuniz	ation			Unirra	Unirradiated controls
ret	rads per	ment group	_35	-28	-21	4	6	-7	-5	7-	-	-2	\$ +	+7	Toxoid Toxin	Toxin
35	900	9×9					4			13 4		4			2 0	67 1
							27			27		35			71*	*89
8	500	6×12			5 6		19 4	-		16 10		4		0 0	2 1	71 0
					69		69			20		02		69	92	71
Ŋ	500	3×12		6 3		2 2			%	-	6 1		_		0 0	36 0
				35		53			35		35		8		36	36
⋉	500	5×12		11 12		19 4			21 3	21 8	8 61		5 3		2 0	300
				27		57			4 1 *	84	51		53		45*	30*
×	200	5×12		6 8	9 6	20 5		24 8		26 15					2 0	59 0
				48*	51	53		29		27					59	29
ઝ	200	9×01	6 61	17 12	22 4	24 8	23 8	25 6	22 8	21 1	21 5	9 4	1 2	3 0	3 1	58 0
			51	27	57	55	52	51	54	26	29	27	8	28	8	28
ಸ	200	4×6	0 0	0 1	1 0	0 2	0	0	0	0 1	0 0	0 0	0	0	0 0	24 0
			45*	48*	41	36*	30*	30*	23	7	24	74	23	23	54	24
m	350 10	9×01	0	3 1	2 0	5 2	4 2	3 4	5 2	4	8 0	2 2	0 0	0 2	2 1	8
	-		34*	35*	41*	47*	53*	53*	27	29	29	8	26	29	ક	8

Non-standard number of mice in treatment group.

TABLE II. X-ray deaths, and deaths and losses of mice attributable to other causes

The two entries in each cell give the number killed by X-rays over the number of deaths or losses due to other causes.

		F	ime of i	rradiatik	Time of irradiation; days before or after secondary immunization	before	or afi	ter sec	ondary	imm	nizati	uc			Unirr	Unirradiated controls
-28 -21 -14	21		41-	1 1	6	7-		2	7-		_	+2	+ 5	+7	Toxoid	Toxin
					6				6			_				
					0				0			0			-	4
2	2	7			3				7			_		7		
1	1	-	-	_	0				0			_		-	7	-
1 6	1 6	9	9				-	_		-			7			
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0 1 0	1 0				0	0		_	0	0	-	0	-	-	0	0
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1 1 1	1 1 1	1 1	-		_	1		3	-	-		0	-	1	0	0

TABLE III. Toxin deaths plus cases of paralysis expressed as percentages of mice at risk

Standard error = $1000 \sqrt{\frac{pq}{n}}$ where p is the frequency of deaths plus paralyses, q the frequency of survivors, and n the number at risk.

			1												
Replications × mice per treat-			-	Time of irradiation; days before or after secondary immunization	radiatio	n; days b	efore or	after sec	ondary i	mmuniza	tion			Unirradiat	Unirradiated controls
ment —35 —28		-2	∞	-21	41-	6	1-	S	2	ī	+2	+8	+1	Toxoid	Toxin
y						Ş			ÿ		7			~	8
 O K O						3 6			- 6 6		+			±2,	
6×12				16		33			37	-	=		0	4	8
3 < 12	96	26		4	4	9 #	-	75	9 +	70	₩ 4	9		∓ 0 0	81
14	+7	+1			+			∞ H	_	± 7		∔			
5×12 40	4	4			4			29	8	53		15		\$	8
*	9 #	9 #	-		9#		-	8	± 7	± 7		∓2		±3	
5×12 35	35	35		53	47		24		72					ო	90
1 +7	17	± 7		9 ‡	± 7		9#		9#					# 5	
		51		9	28	8	19	26	36	4	53	5	S	۲-	8
7		±7		± 7	± 7	± 7	±7	± 7	± 7	9 ∓	9 ∓	±3	+ 3	+3	
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		± 7		∓5	4+	+3	∓3	+4	+	,	1	#	₩,	•	
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±3 ±5		#		±3	∓2	+ 4	∓2	4	+ 4	# 2	+3		∓ 5	#3	
										-		-			

TABLE IV. Tests of heterogeneity based on the data in Table I

	Degrees of Freedom 1	Xs Degrees of Preedom 9.74 1 28.19 1 5.44 1	78 1 9·74 1 28·19 5·44	x³ 9.74 9.74 5.44
		9.74 1 28.19 1 5.44 1		0.02-0.01
		28·19 1 5·44 1		0.02-0.01
		5.44		0.3-0.2
_		_		
•		21.24	0.2-0.1 21.24	
		1	<0.001	
-		89-53	0.3-0.2 89.53	
1		1	1	
-		8.74	0.3-0.2 8.74	
			8.74	0.3-0.2

† Fisher's exact test.

* Treatments grouped because of small numbers of mice.

§ Response is not higher in control.

‡ Response is higher in control.

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Discussion

Dose and time of irradiation

From the results obtained in this investigation it has been concluded that total body X-irradiation of mice resulted in inhibition of the immune response to a second immunizing dose of tetanus toxoid. This effect was shown to be dependent both upon the dose of X-irradiation and upon the time at which it was given relative to the second dose of tetanus toxoid.

Hale and Stoner (1956) studied the amount of Cobalt-60 gamma-radiation required to inhibit the secondary response of mice to tetanus toxoid by irradiating one hour before the secondary stimulus and subsequently determining serum antitoxin levels. They found that doses higher than 450 rep. were required to produce appreciable diminution of the response and that 350 rep. had little if any effect. In our experiment, however, 350 rads, was sufficient to produce some degree of inhibition.

Hale and Stoner also found that 650 rep. gamma-irradiation, given at various times from two days before the secondary stimulus to three days after, severely depressed the antibody response and that this inhibitory effect was more pronounced in the groups exposed to irradiation before the secondary stimulus. Makinodan. Friedberg, Tolbert and Gengozian (1959) used the antibody response of mice to sheep red blood cells to study the relation of secondary antigen injection to time of irradiation and found that a depression in the antibody response took place when 710 r X-irradiation was given from five days before to one day after with a maximum at one hour before to one day after the secondary stimulus. Taliaferro, Taliaferro and Janssen (1952) measured hæmolysin formation in rabbits after 600 or 700 r whole-body X-irradiation delivered from 56 days before to 4 days after a secondary injection of sheep cells and found that the greatest observed depression in response was when irradiation was given two days before the injection.

These findings are broadly in agreement. They indicate that the greatest depression of the secondary immune response occurs when the irradiation is delivered close to the time of secondary injection. The precise time of maximum effect may differ somewhat according to species, antigen and radiation dosage. Our own results are consistent with this conclusion, but go further than previous studies in demonstrating that a pronounced effect is produced even when the interval between radiation and secondary immunization is as long as five weeks.

In war the wounded soldier should receive his 'boosting' dose of tetanus toxoid as soon as possible after wounding and probable irradiation from an atomic weapon, but no doubt a delay of a day or two might occur. Thus, if extrapolation of these results is possible for man, the irradiated soldier may be at a stage of marked inhibition of his immune response on receiving the 'boosting' dose of tetanus toxoid.

Delay in or reduction of antibody production

Crosland-Taylor (1955) investigated the inhibitory effects of X-irradiation on the secondary response of rabbits to fluid tetanus toxoid and employed in vitro serum antitoxin estimations. He found that the action of X-rays on the secondary antibody response was twofold; there was a delaying action on the start of antitoxin rise and peak titre, and there was a reduction in ability to form antitoxin. He found

that 400 r whole-body X-irradiation of rabbits given ten days before the second injection of tetanus toxoid produced both a delay and a reduction, while the dose given at two days and at six hours before produced delay only. Smaller doses of 100 r and 25 r given ten days before produced only a delay.

Hale and Stoner's (1956) investigations are helpful here also, as they found that following 700 rep. whole-body gamma-irradiation given four hours before the second injection of toxoid, the serum antitoxin levels were still low 30 days after secondary immunization. They therefore concluded that the secondary response was severely inhibited and not just delayed.

In the present investigation toxin challenge was given 14 days after secondary immunization, and it was therefore impossible to tell whether the inhibition in response observed after 500 rads. was due to a delay in or reduction of antitoxin production. However, the average incubation period for tetanus in the human is under ten days (Sachs, 1952) and therefore the toxin challenge (if this term may be used of the disease) in wounded men infected with *Cl. tetani* would be likely to be less than ten days after boosting 'immunization, assuming that immunization was carried out immediately upon wounding. If there is no protective antitoxin present at this time, the question of whether this is due to a delayed or reduced antibody response is largely immaterial from the point of view of the outcome of the infection.

Possibility of recovery

Makinodan et al. (1959), using the method already referred to, compared the effects of X-irradiation upon primary and secondary antibody responses of mice and found that recovery of the secondary response took place within two weeks in contrast to the eight or more weeks required for recovery of the primary response. Taliaferro, Taliaferro and Janssen (1952) found that for rabbits the ability to elicit an amnestic response was largely recovered if X-irradiation was given 31 or more days before secondary immunization. On the other hand Thompson and Talmage (1957), using the secondary response of rabbits to bovine serum albumin and irradiating with 350 r, found that irradiation given 30 days before secondary immunization produced greater inhibition than when it was given 2 days before, and we have found that recovery was not apparent even when the irradiation was given 35 days before the second dose of toxoid.

If we may assume that these various findings are capable of extrapolation for man, then it would seem likely that the irradiated soldier would not be capable of responding fully to any active immunizing procedures for a period of a few weeks at least after irradiation.

The variability of mouse strains

PCT male mice used in this investigation have shown themselves to be almost uniformly responsive to complete immunization with two doses of 0.5 ml. tetanus toxoid. The toxoid control figures show a protection level of 96 per cent in the 422 mice used as controls. This is an extremely satisfactory result in view of Barr's (1957) finding that, compared with guinea pigs, mice were refractory to immunization with fluid tetanus toxoid and showed considerable individual variability. As she suggests,

however, it is likely that different mouse strains vary in their capacity to respond to tetanus toxoid.

Summary

Male PCT mice were immunized with two doses of tetanus toxoid separated by a six-week interval, and their immune response to the second dose was tested by challenge with tetanus toxin 14 days later. Whole-body X-irradiation with 200. 350 and 500 rads was given at intervals ranging from 35 days before the second dose of tetanus toxoid to 7 days after. The mice were inspected daily after the toxin challenge and the criterion of inhibition of immune response was taken as the percentage of deaths and paralysed survivals occurring on the eighth day.

The results showed that the secondary response to tetanus toxoid was radiosensitive, but it depended largely on the dose of X-irradiation; a dose of 500 rads. produced about 50 per cent inhibition. Radiation given from 35 days to 1 day before the second dose of tetanus toxoid produced most inhibition; when given 2 days after the second dose it was less effective, and it was ineffective when given 5 or 7 days after. These results are discussed and the possible military implications are drawn.

We are grateful to Miss M. Barr of the Wellcome Research Laboratories for the supply of the tetanus toxoid and toxin used in this investigation, and we are indebted to Corporals M. P. Quick and A. E. Cooper, R.A.M.C., for valuable technical assistance, and to Mr. T. F. J. Hobson for the computations.

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TROPICAL MEDICINE IN CYPRUS

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WITH the dwindling of our overseas commitments, the amount of tropical medicine in Army practice is inevitably diminishing. During 1957 to 1959 British troops stationed in Trucial Oman and Jordan were evacuated to Cyprus, where tropical disease is uncommon enough to cause occasional diagnostic surprises. Cyprus is a healthy island with a Mediterranean or sub-tropical climate and on arriving there in winter I was impressed by the fit appearance of the troops, for the expectation of life in Cyprus is only slightly less than that in England and Wales. The rainfall is low, there is little fog or damp weather, and winter itself is full of warm days, though occasional snow falls on the plains and the north-east wind can be bitterly cold, but this contrasts with the summer weather, for in Nicosia no rain falls between May and mid-October, and in July and August the temperature may rise to over 110°F.

One of the most pressing problems was the study of little-known short-term fevers, previously called 'sand fly,' 'flu' or 'Cyprus flu.' Although these illnesses were generally recognized as clinical entities, we lacked a full understanding of their ætiology and pathogenesis, and an investigation was carried out under the direction of Brigadier W. R. M. Drew, then Consultant Physician, Middle East Land Forces. By the end of 1957 it had been discovered that Q fever was a widespread seasonal disease, from February until July, and in three years about 100 cases were confirmed serologically. Conditions were favourable for the dissemination of Rickettsia burneti, for there were vast numbers of sheep, goats and dogs abounding with ticks. Why there is a seasonal incidence is as yet unexplained, though the gradual rise in temperature, the winds, and the sheep-shearing in the spring, things which facilitate the spread of tick dejecta, may all be contributary factors. Other phenomena, particularly its local occurrence in one battalion in successive years, are still unexplained. The clinical features of Q fever are well known; severe headache, photophobia, a heavily coated tongue, high temperature and relatively slow pulse. Chest complications occurred in about 90 per cent, with the characteristic sign of fine crepitations at the very end of inspiration. The white blood counts never exceeded 11,000/mm.3 and were usually between 5,000 and 7,500. The disease seldom lasted more than seven days, though in one case it continued for five weeks, and despite the absence of chest complications, the antibody titre was 1/512, the highest recorded in Cyrpus.

As far as is known there have been no cases of malaria among the civilian population for many years, and none were noted among Service personnel which could have been contracted in Cyprus. During 1958 a Royal Army Service Corps convoy was on a night move in Jordan when the drivers were badly bitten. As a result, twelve contracted benign tertian malaria and were evacuated to Cyprus, where they were successfully treated with chloroquine. Two other soldiers from Trucial Oman were also admitted.

In bacillary dysentery, Sonne and Flexner II, III, IV and VI appear to be the most common organisms, and sulphonamide-resistant cases respond dramatically to terra-

mycin. For infective diarrhœa the effect of sulphonamides was not so striking, and it may be that if used at all the broad-spectrum antibiotics have a place. Amæbic dysentery is uncommon and only two cases occurred.

No cases of typhoid were admitted to the Army hospitals and only two patients were admitted with paratyphoid. One was a merchant seaman who was thought to have acquired it in Jordan, and the other, a severe case, showed no clinical response to chloramphenicol, though there was a satisfactory response to Aureomycin to which the organism was sensitive. The dissociation between the occurrence of these diseases and bacillary dysentery is curious, for it might be thought that the conditions were ideal for both. On the other hand, notifications of typhoid in Cyprus, with a population of half a million, were only 42 in 1958, and 52 in 1957.

Infantile gastro-enteritis is widespread and a grave problem, though it is normally only serious in children under the age of one, when it provides as exacting demands on nurses and doctors as can be found anywhere in general medicine or surgery. As far as our experience went in Cyprus, antibiotics were of unpredictable value, and the disadvantages of thrush and an increase in vomiting and diarrhoea may well militate against their use. Hydrocortisone intravenously has been tried in one or two gravely collapsed cases, but although these improved, it is questionable whether the restoration of electrolytes and circulation by intravenous therapy alone might not have done equally well. The scalp-vein method was found excellent for children under 10 lbs., but only for a short time. There is a limit to the number of drops per minute that can be run in, for a mixture of plasma and 5 per cent dextrose is often too thick to use at a satisfactory rate. For the gravely collapsed child, the internal saphenous route is far more satisfactory. The increasing recognition of the importance of potassium loss in the diarrhea of infants has led to the introduction of oral potassium in these cases, and while it is satisfactory when the diarrhœa is mirnimal or has cleared up, there are many cases which drag on for weeks needing prolonged intravenous therapy. When Hartmann's solution is used a potassium deficit may arise, as the solution contains only 5 mEq/1. It may be wise to mix 0.5 gm. of potassium chloride from a sterile ampoule with alternate pints of the repair solution. which will add about 6.75 mEq. It is not possible to estimate with accuracy the true extent of potassium loss, for its place in the cells can be taken by sodium, and a serum potassium at the lower limit of normal may co-exist with potassium deprivation. Thus the very limp, pale child with a distended abdomen and absent knee jerks. and a low normal potassium, may in fact be suffering from a moderately severe deficit. Low potassium values may also be associated with ædema and paralysis of limbs and diaphragm, and in view of what may be misleading blood readings, a clinical appreciation may have to be made, since the electrocardiograph offers many difficulties in infants. As a result an infant with relapsing diarrhœa is still a trying problem, particularly when associated with abdominal distension, which once established is very difficult to overcome. Its cause may be hypokalæmia, vitamin B deficiency owing to reserves being depleted by sterility of the gut, diarrhœa, the administration of glucose or something even less apparent, but the administration of potassium and parenteral vitamin B, and abstention from any form of glucose for one or two days may make no difference, and a flatus tube gives only slight relief. It may be said that the commoner antibiotics in general use are of doubtful value, even in cases where specific serotypes of B. coli have been identified.

Short-term fevers must be observed critically, and the loose label of 'sand fly' or 'dengue' is to be deplored. In Manson-Bahr's Synopsis of Tropical Medicine (1952) it states under Phlebotomus Fever: "Serious cases resemble benign lymphocytic meningitis: head retraction, Kernig's sign, C.S.F. pressure increased, lymphocytes 74-300/mm.3" In 1959, between June and October, 170 men had short-term fevers characterized by headache, a transient sore throat, a stuffy nose, backache and lymph-glandular enlargement. Twenty-four had meningitis, and six had chest shadows. The sera of three showed a rising titre diagnostic of lymphocytic chorio-meningitis virus, and 20 more were a doubtful positive. It would have been easy to dismiss these cases under some non-committal heading but the Army has much to offer in the elucidation of many short-term fevers provided that virus studies are undertaken energetically and close liaison is maintained with the local pathologist and with the Royal Army Medical College.

Leishmaniasis is endemic in certain parts but is far from common, although four cases occurred in the early months of 1957. The first three were young soldiers with lymphadenopathy and slight splenic enlargement characteristic more of the infantile type of kala-azar. They were sent back to England as cases of sarcoid, but biopsy of glands revealed that they were in fact suffering from leishmaniasis. The fourth was a boy of two years, who had a small papule on his left cheek for several months which had been gradually getting bigger. Eventually it broke down and discharged forming a lesion about as big as a halfpenny, which was treated by his own doctor as a patch of impetigo made chronic by picking at it. The dermatologist considered a diagnosis of lupus vulgaris, but biopsy confirmed that it was cutaneous leishmaniasis.

Tick-borne relapsing fever was seen in some cases while troops were engaged on active operations and were either sleeping in or searching caves and dwellings where sheep and goats had been harboured. There is no doubt that infected ticks caused a high morbidity, for from one troop of 27 gunners, 6 were admitted to hospital with relapsing fever, and 4 others were found to have had a similar type of illness at about the same time. It is highly probable that these men were also infected, for the disease may have only one bout of fever, as opposed to the normal four to six. This fever may initially masquerade as many different diseases. The joint pains may cause real difficulty from rheumatic fever, and the slight tinge of jaundice and tenderness over liver and spleen may confuse with infective hepatitis or malaria respectively. Characteristically it lasts from 3 to 5 days and recurs 4 or 5 times every 5 to 7 days, although these limits may vary appreciably. The patients were treated with Terramycin 1 gm. daily for 7 days with no further relapses. In diagnosis it is well to remember that spirochætes are scanty, and half-hourly thick and thin blood films are necessary, preferably while the temperature is rising. A case occurred just before I left Cyprus where fever only lasted 36 hours and recurred every three days. This was resistant to Terramycin but responded readily to penicillin and streptomycin in full doses.

No instance of heat hyperpyrexia was recorded, but there were occasional cases of heat exhaustion. One case arising in a rather insidious way proved very interesting

and served as a reminder that vague ill health, so-called neurosis, or seeming severe organic disease may in fact be due to electrolyte deficiency.

A private aged 19, for 14 days had dizziness on standing, during which time he had complained of headaches and vomited frequently. He was admitted in a semi-comatose state, looking very ill with sunken eyes and a lax skin, and was vomiting profusely. His pulse rate and temperature were normal but his blood pressure was 110/50, and his blood chemistry on three successive days was: sodium 126, 120 and 135 mEq., potassium 1.9, 1.6 and 2.05 mEq., chloride 60, 70 and 82 mEq., CO₂ 33 vols. and 53 vols. (no reading on the third day), and blood urea 520, 360 and 120 mg./100 ml. Urinary chlorides 1 gm/litre and E.C.G. showed changes of potassium deficiency.

This was a remarkable case and the height of the blood urea and general severe derangement of the serum electrolytes was a surprise, as was the dramatic response to intravenous salines (to which was later added potassium) and to oral Darrow's solution. The pathogenesis is interesting, but it is difficult to trace the exact train of events. Perhaps the loss of chlorides had been insidious over several weeks leading eventually to vomiting which set up a vicious circle. Equally, vomiting may have been due initially to some mild gastro-intestinal infection, and may have been prolonged by purely psychological causes. Nonetheless, it is puzzling that in spite of such severe chloride deprivation the heat-regulating mechanism was not affected.

Poliomyelitis may be included in a paper on tropical medicine, for in the tropics and sub-tropics the disease is so widespread that immunity is gained early in life. An example of this was a study of a number of children in Cairo under the age of four years which revealed antibodies in every one. The year 1958 was notable for the most severe epidemic in the history of Cyprus. The number of Service cases treated in the British Military Hospital, Nicosia, was 35, the epidemic beginning in February, the coldest month, and ending in August. The two epidemics, civilian and military, were in contrast. Whereas among the Cypriot population 80.7 per cent of cases occurred under the age of four and all were paralytic, only 66 per cent of the Service cases were paralytic. The severity of the disease in adults was pointed by the fact that of the children attacked, 5 were paralytic and 5 not, in adults 18 were paralytic and only 7 not. In isolated hospitals overseas a long period of freedom from poliomyelitis may suddenly be broken by a devastating case needing positive pressure respiration. No centre is near at hand and it is probable that few people will have had experience of nursing such cases. In Cyprus it was felt that the best method of meeting such an emergency was to have three teams consisting of a nursing officer and three others. The teams were on call for 24 hours in rotation, and during the actual nursing of a case on positive pressure respiration, they worked in 8-hour shifts throughout the 24 hours.

Diphtheria is common in Cyprus due to the standard of protection being lower than in European countries. Only two cases have occurred in Army practice, one a man of 50 developing myocarditis, polyneuritis, and bulbar palsy, requiring a tracheostmy.

Cyprus is now an important British base in the Middle East, and it may be useful to record for those practising medicine there the results of three years' practice in Army hospitals in so far as it related to tropical medicine and to diseases of temperate climates modified by high temperatures and a lower standard of hygiene and preventive medicine among the civil population. Many fevers lasting a few days still occur; a critical approach should be made to all of them, and virus investigations should be undertaken, rather than dismiss them as unusual cases of 'flu.'



NAPOLEON'S SEX LIFE

Major-General F. M. RICHARDSON

C.B., D.S.O., O.B.E., M.D. (retired)

PART II

NAPOLEON'S doubts of his fertility are reflected in the coarse remark he made when choosing his second wife. When told that her mother had had thirteen children he said "That's the kind of womb I want to marry." If we accept Brice's diagnosis of Fröhlich's syndrome, those doubts were well founded, and it is unlikely that Napoleon was the father of the children attributed to him. Some of these claims can no doubt be ascribed to gossip, or to feminine vanity which could have led some of his alleged mistresses to invent or exaggerate their affairs with the greatest figure in the world. And of course he was very generous to his mistresses and their offspring.

Napoleon in his will acknowleged only two illegitimate children. The first, Florian-Alexander-Joseph, born on 4th May, 1810, was the illegitimate son of Maria Walewska, the widow of Count Walewski, who had a number of other children. The verdict on this child can be left to the Russian Emperor. After Napoleon's divorce a marriage with a Russian princess was proposed, but the Dowager Empress would not hear of it, and told the Emperor Alexander about Josephine's statements on Napoleon's impotence. Incredible though it may seem, Josephine had been interviewed on this subject by a Prince de M. (believed to be Mecklenburg-Schwerin) who had carried out the task with so little finesse that Talleyrand had advised Napoleon to dismiss him from court. Alexander mentioned the Prince de M's. report to the French Ambassador, "who objected that the Emperor already had a child by Mme. Walewska. 'Yes yes' exclaimed Alexander, 'but everyone knows what young Polish women are like. She probably had other lovers." (Quoted in Bertrand's memoirs). The second child to be considered is Charles, called Count Leon, born on 6th December, 1806, to Eleonore Denuelle de la Plaigne. Here is what Bertrand says "As it was Murat who had introduced the mother to him, Napoleon had at first assumed the child to have been his. But upon seeing the child the Emperor had been so struck by its resemblance to himself, while Queen Hortense, to whom he had shown the child, had found that it bore such a striking resemblance to the Emperor, that he had acknowledged it to be his own son." This would hardly be accepted as evidence in a paternity case today, and there were widespread doubts about it at the time, as indeed there were about the paternity of Napoleon's one legitimate child, the King of Rome. It was common gossip at the Schönbrunn that whoever was the father of that child it certainly was not Napoleon. The obvious candidate is Neipperg, whom Chateaubriand called "the man who dared to lay his eggs in the eagle's nest." Lord Stanhope in his Notes of Conversations with the Duke of Wellington records that in 1840 "Rambling from subject to subject we came at length to the ex-Empress Maria Louisa. The Duke said that the first time he had seen her was during the Congress of Vienna in 1815.

Erratum: In Part I of this article in the Journal for October, 1961, p. 222, line 17: Mme. Perron should read Mme. Permon.

when he went to pay his respects to her at Schönbrunn; but owing to the state of things in France, he did not often find himself in her society. It is a very curious thing, he added, that she afterwards said to someone: "The Duke of Wellington little knows the service he has done me by winning the battle of Waterloo!" She was with child by Neipperg whom she afterwards married; and if Napoleon had prevailed she would have had to return to him in that state." The Duke was not addicted to gossip and he was wrong here, for her first bastard by Neipperg was born in May. 1817, but at least one writer, M. E. Ravage, asserts that she met Neipperg before her marriage to Napoleon, and suggests that she had been "slowly falling in love with him" ever since that first meeting.

There is abundant evidence of his rudeness and unpleasantness to women, and Bourrienne sums it up: "Politeness to women was not one of Napoleon's habitual traits. He rarely found anything pleasant to say to them, or would say the most outrageous things." Though he seems to have been fond of children, he thought it amusing to accuse wrongly a little five-year-old niece of wetting the bed; and to snatch away little Betsy Balcombe's first party dress, and let her cry herself to sleep. Bourrienne says, "It was one of Bonaparte's greatest misfortunes not to believe in friendship or experience the need to love. How often I have heard him say 'Friendship is only a word. I care for nobody." Lord Rosebery in Napoleon, The Last Phase wrote "He wonders if he ever really loved anybody. If so it was Josephine—a little Had she had a child of his she would never have left him."

Little wonder then that there is a general consensus of opinion as to his unloving nature and lack of tenderness; but according to Lord Rosebery, Napoleon himself said that "he was naturally susceptible and feared to be dominated by women. Consequently he had avoided them." However, he claimed to have had seven mistresses and Savant lists throughout his career an unending series of women, by many of whom he is said to have had children. He is said to have "taken liberties" with his sister Pauline; to have been the father of the elder child of his step-daughter Hortense. married to his brother Louis; to have had a daughter by Mme. de Montholon at St. Helena. He does not seem to have wasted much time making love to any of them. except perhaps to Desirée, and Masson describes him as being "unfamiliar with courteous phrases and not hiding sufficiently the contempt he felt for women who came to him on the message of a valet." Mlle. George, the actress, left an account of her affair with Napoleon, who seems to have tried to treat her kindly, and certainly with financial generosity. She idolized Napoleon and both hoped that a child would result from their association. At the first meeting to which she was fetched by the valet, Constant, though she stayed 'til 5 a.m. it is clear that nothing happened (in the sense in which we are here, somewhat improperly, interested). Napoleon, who was deeply interested in the stage and modelled many of his mannerisms and gestures on Talma, seems often to have merely wanted to discuss the play and to have behaved with lack of sentiment. Roustam the Mameluke was often present behind a screen and Mlle. George would soon be sent packing and promptly forgotten. Incidentally her name was really Marguerite-Josephine Weymer. She was first called "George" by her patroness Mile. Raucourt, another actress friend of Napoleon, who often dressed as a man, was addressed as "papa" by the child of a Mme. de Ponty, and was "never at home in those parts which required feminine charm." Now I mustn't clutch at straws in trying to prove that Napoleon was odd, but here is a straw which seems to show that an unusual wind was blowing now and then.

There was nothing very unusual in a public figure of his age having mistresses and making little effort to conceal the fact. Our own King George II, urged by his wife on her death-bed to marry again, said between sobs, "No, I shall have mistresses." But Napoleon's apparently relentless search for sexual adventures when he seems to have cared so little for women in every other way may well point to an urge to reassure himself and to exorcize his deep-seated doubts of his own masculinity. Three psychiatrists in A Factual Study of Male Homosexuality! emphasize that many homosexuals are sexually promiscuous with women. Presumably they cannot settle down to family life based on true love for one woman, of which they are incapable. No one who has studied it in any detail could possibly claim that, even with Josephine, Napoleon's family life was very normal or happy. The undoubted fact that Napoleon for long feared that he was sterile, supported by the inference that Josephine's remarks were intended to imply as clearly as possible that he was also impotent, and by the strong evidence that physically he could be defined as "sexually deprived," by no means prove that he was not psychologically heterosexual, still less that he was homosexual. There is evidence to suggest that he had such leanings, even if not to a marked degree, though I have not so far heard of this suggestion being made. It is very well known that he liked to have physical contact with his soldiers. He used to embrace them, to grasp the buttons on their tunics, pull their ears and hold on to their noses. The latter gesture may be significant. In the Factual Study just mentioned a man is recorded who "was attracted by boys' noses; they were sexual objects, and if he grasped a boy's nose he had an orgasm." Pulling a man's nose was not an uncommon insult or incitement to a duel; but rubbing noses as a greeting is practised in places like Polynesia where homosexuality is common. The Mameluke Roustam, a young Armenian who until he deserted Napoleon just before Elba was his constant personal attendant from the day when Napoleon picked him up in Egypt at the age of seventeen, has described their first meeting. "First thing he does to me he pulls my ears," and later whilst on board ship returning to France, "still pulling my ears, as every day."

In the pamphlet Advice on Sex in use in B.A.O.R. I have explained how young men through misunderstanding may linger in the normal homosexual period, a phase through which many pass unknowingly. It would not be at all surprising if Napoleon's "organ inferiority," small stature, and slightly feminine build, and other influences all reinforced this tendency to linger. It has been said that if all males were exclusively heterosexual (Kinsey rating 0) normal social life in clubs and messes would be impossible, since we would all behave like stags, rounding up as big a share as our strength allowed of the available hinds. It is the "continuity of the gradations between exclusively heterosexual and exclusively homosexual behaviour" which makes male friendships possible, but gives them such a varied nature, from David and Jonathan or Alexander and Hephaestion to what we would regard as normal friendship.



¹Brit. med. J. (1958) 2, 1317-1323.

Napoleon when he chose could be completely charming, compelling, and magnetic. When he was a captive, Admiral Keith was determined not to let him meet the Prince Regent, as he was sure they would soon be the best of friends. Things might have gone better for Napoleon in 1813 if he had tried on Metternich the tactics which so charmed the strange impressionable young Tsar Alexander on the raft at Tilsit. The spell was still strong more than a year later at Erfurt, when they kissed each other before the assembled grandees, who were "struck by their show of affection for each other." Alexander, a handsome bachelor most attractive to women, was himself most strange and sought more for a "soul mate" than for what his mistresses expected. He became more and more of a mystic, almost a hermit, and died a bachelor. A Scots soldier recounted that the Tsar's interest in the perennial question of what is worn under the kilt would not be satisfied short of actual inspection, and that even then to be sure that there were no pink silk tights he actually pinched the indignant Highlander's behind.

I must here say clearly that I am not suggesting that there was anything overtly or even consciously homosexual in Napoleon's approaches to men, though it is significant that they were made almost entirely to the younger set. He was positively horrid to many senior officers, including his marshals, even to Berthier, a man 16 years older than himself, to whom he owed so much. None knew better than he how much he owed to Berthier, and in his more expansive moments he would refer to him as his "brother in arms . . . faithful companion in war" and sometimes, according to Ménèval, as his "wife." But he was used as a whipping-boy to take the blame for any reverses; even when Napoleon peppered another "gun" at a shooting party. He stormed and raged at generals in public, brutally kicked elderly men, including councillors. I cannot recall any instance of his sudden rages and assaults breaking out upon younger people.

If his methods of wooing the affections of the young and impressionable contributed greatly to his magnetic sway as a military leader, it certainly also helped to establish the Napoleonic Legend. These were the men who survived him long enough to foster it. The elder ones, many of whom had won titles and riches under his rule, knew him better but had a vested interest in silence or consent.

Had army psychiatrists existed in his day Napoleon would have been too astute to fall into their clutches. He would have been one of those who disapproved of their activities, if we can judge from his remark: "Psychology is no more within the province of generals than of squadron commanders; they only have to deal with the human frame—all that is under the skin belongs to the philosophers." A psychiatric diagnosis made without examining the patient must be slightly suspect, though these are made every week when coroners and their juries record verdicts "of unsound mind" in cases of suicide. To sum up I would say that although Mme. Mère was certainly not the kind of mother who makes homosexual sons, Napoleon's physical disability and somewhat feminine appearance, and various early influences, combined to give him homosexual tendencies, with a Kinsey rating of about 3; compared with Alexander the Great at about 3.5, and Frederick the Great and Richard Cœur de Lion between 5 and 6. If the last name causes surprise, read *The Lute Player*, the theme of which is Richard's homosexual friendship with Blondel. Berengaria's married life



was a complete fraud, and if Napoleon had known about this he might have been displeased with the German scholar Ritterstein who claimed to have proved that Blondel's real name was Buonaparte, and that he was Napoleon's ancestor. Napoleon, being Napoleon, had to have a finger in every pie, and be, as it seems many homosexuals are, promiscuous with women. This in his case was re-inforced by his need to produce an heir for dynastic reasons. It is I think impossible to ascribe the contemporary gossip about his impotence and sterility and the speculations about this side of his life to mere malicious gossip fabricated by lesser men to denigrate a man whose eminence they envied, and perhaps to comfort themselves with the smug reflection that the great are not always the happy. The justification for probing such matters is that it may throw light on the psychological mechanisms which may drive unhappy or even unbalanced individuals to dominate their contemporaries.

Postscript

I have now read at least 30 more books about Napoleon, some published since I wrote my essay, as well as standard works like de Bourrienne and de Ménèval, and some even more massive tomes like the seven volumes dictated to de Montholon by Napoleon himself on St. Helena, and Sir Walter Scott's nine volumes, which I skipped through (really life is not long enough these days for Waverley wanderings). I have also re-read Raoul Brice's The Riddle of Napoleon, and Napoleon For and Against by Professor Pieter Geyl, a wonderful, scholarly work which anyone who is at all interested in Napoleon should read. More thousands of millions of words have been written about Napoleon than about any other character in history. Many thousands of them were dictated or inspired by the man himself in the process of diligently creating and fostering what came to be known as the Napoleonic Legend. His unique character was so many-sided that, by assiduous and partisan reading, one could probably "prove" almost any theory about him which one cared to adopt. Doctors have differed about him ever since those present at his post-mortem examination quarrelled furiously about whether his liver was or was not enlarged and diseased. But it is with Napoleon's psychological make-up that I am concerned. Another book published since I wrote my essay (The Last Years of Napoleon by Ralph Korngold) has some odd things to tell about the relations between Napoleon and Gourgaud, who is said to have "conceived an affection for Napoleon which bordered on the pathological." When relations became strained, and Gourgaud decided to leave St. Helena, he said to the Governor that Napoleon wished him to do things "contrary to his honour," and later wrote that he was troubled by dysentery, to which had recently been added afflictions of a "moral nature." Napoleon himself after Gourgaud had left, said "Speak to me no more of that man. He is mad. He was jealous, in love with me. What the devil! I am not his wife and can't sleep with him. I know he will write libels about me, but I don't care." What are we to make of all this? It may well have been all Gourgaud's fault. Nobody could really be negative about Napoleon and Lord Rosebery said that Gourgaud was "devoted to his master with an unreasonable, petulant jealousy, which made his devotion intolerable."

I do not want to seem eager to blacken Napoleon's character. Whatever may have been the many springs which fed his desire to dominate, one can hardly fail

to be sorry for so domineering a man, whose attitude to men and women alike was so masculine and overbearing in his lust for power, when one realizes how he must have been tortured by his fears of sterility, and probably also of impotence. and have seen his body becoming more and more feminine in appearance. What were his real feelings when, as de Ménèval says, he "loved to joke about the fatness of his breasts"? More than one contemporary writer spoke of a "roundness of figure, not of our own sex"; and he was once taken for "an elderly governess." He himself saw in his body a resemblance to a young female beauty, and made an often-quoted remark to Antommarchi, differently translated in different books, but on these lines "See Doctor, what lovely arms, what smooth white skin without a single hair! what rounded breasts—any beauty would be proud of a bosom like mine." A great military leader could hardly have liked looking like that, and there is something pathetic in his drawing attention to it, and even boasting about it. I should like to hear the views of someone with a good knowledge of endocrinology, or even of genetics. Would a physician of today amend Brice's diagnosis to Klinefelter's syndrome? If, as is suggested by some writers, a marked change in his physical appearance began at about the age of 38, could this account for the infantile external genital organs, or must they have been more or less in that condition all his life?

In a book called Personality and Power there is to be found this surprising remark about Napoleon. "He . . . was without religious feeling in the Christian sense, and, finding himself incapable of giving her a child to be his heir, caused his wife, Maria Louisa of Austria, to be artificially inseminated, and successfully." Unfortunately the author, the late Mr. Shaw Desmond, who says that, "the love personality of Napoleon is one of the most elusive phenomena in history," does not give us a clue as to where he found his information about the method of securing an heir to the throne of France. A diligent search through the medical articles which have been published about Napoleon may throw light on this, but if anyone can enlighten me I should be most grateful, though I hardly expect to be told if the method was A.I.H. or A.I.D. This is, in fact, the kind of compensation which I meant in my first paragraph. I have always thought that our Journal needs a lively correspondence column (see my letter in the April 1961 number), and as I intend to write all this up in greater detail, perhaps in a book, I would like to hear comments on my views, however acrimonious. The English have always been good at forgiving their enemies, and were in the forefront in the creation of the Napoleonic Legend. All of us as schoolboys have grown up with an almost superstitious reverence for the great name, so that it is impossible not to feel slightly sacrilegious when emphasizing the less attractive side of his nature. But to a doctor it should not seem too unfriendly to try to uncover the psychological mechanisms which may have caused the evil side of his nature to proliferate at the expense of the good. It can even help us to feel more kindly towards him, and perhaps to lesser dictators who, possibly for somewhat similar reasons, have grown into men who troubled the world, or even troubled only ourselves in our more limited sphere.

CHLOROQUINE RETINOPATHY

A Further Case

Brigadier J. B. GEORGE M.B., D.O.M.S. (retired)

Colonel P. C. MITCHELL M.C., T.D., M.B., F.R.C.P.(Edin.) (retired)

The Queen Alexandra Military Hospital, Millbank

SYNTHETIC antimalarials have been widely used in the treatment of lupus erythematosus and rheumatoid arthritis since the report of Page (1951). In these two diseases treatment is usually more prolonged, and total dosage much higher, than in malaria. At first mepacrine was the drug most used in the treatment of lupus erythematosus. Although reports had already appeared of corneal deposits occurring in mepacrine workers (Mann 1947) and of retinal changes in persons on high mepacrine dosage (Dame 1946) it was probably mainly the undesirable yellow colouring which the drug imparts to the skin and the occasional occurrence of a lichenoid dermatitis that caused the replacement of mepacrine by chloroquine. Alving (1948) extensively investigated the actions of chloroquine and concluded that it is "a safe antimalarial compound when given in the recommended dosage." Nevertheless, he reported toxic effects in higher dosage (300-500 mgm. of chloroquine base weekly for a year) including bleaching of hair, electrocardiographic changes, blurring of vision, headache, slight weight loss, and two cases of lichenoid skin eruption. Howell (1957) in treating resistant cases of chronic discoid lupus erythematosus went from the usual 200-400 mgm. of chloroquine sulphate daily to 600 mgm. daily, and then found side-effects in over half the cases. The commoner side-effects of chloroquine seem to be related to dosage.

The eye effects in the earlier reports were mainly transient and subjective. More permanent effects, however, in the shape of deposits in the cornea were described by Hobbs and Calnan (1958, 1959) and these findings have been confirmed in many clinics including our own. These authors said that the corneal deposits are "not yet known to cause serious permanent visual defect." In a postscript to their second paper, they stated that, since going to press, they had encountered cases of serious retinal damage following chloroquine. Then Hobbs, Sorsby and Freedman (1959) reported three cases of retinopathy following chloroquine therapy. Wells (1959) reported a case of amblyopia, and Sternberg and Laden (1959) a case of bilateral macular degeneration, in chloroquine-treated lupus erythematosus. It would seem that these two cases, along with the one described below, are similar to those reported by Hobbs et al. (1959), especially as two of their cases had rheumatoid arthritis, and the effects are now generally accepted as being due to chloroquine. It would seem also that the two cases of severe fundal damage in sub-acute lupus erythematosus reported by Goldman and Preston (1957) were probably due to chloroquine. Further cases are appearing in this country (Hobbs 1960) and a case has been reported in France (Grupper 1960).

A married woman aged 37 was admitted to the Queen Alexandra Military Hospital, Millbank. from Germany on 14th June, 1960. She had had lupus erythematosus for seven years, during which she lived in Cyprus, Germany, and West Africa, and had been free for any length of time only when she was pregnant and for six months after delivery of twins (1954-1955). Earlier attacks responded well to quinine. In West Africa she received chloroquine sulphate 200 mgm. daily for about two years from 1957; dosage was increased to 200 mgm. three times daily for several weeks, when there was alopecia of the scalp. The condition recurred again in Germany in 1959, when she received 97.4 gm. chloroquine sulphate in the following dosage: 200 mgm. three times daily, June to September. 1959 (59.4 gm.); 200 mgm. twice daily, October, 1959 (16.8 gm.); 200 mgm. twice daily and daily on alternate days, November, 1959, and January, 1960 (21.6 gm.). This, plus an estimate of 140 gm. in West Africa, gives a grand total of 237 gm. of chloroquine sulphate. She also had quinine sulphate for three weeks in January, 1960, and a course of bismuth while in West Africa.

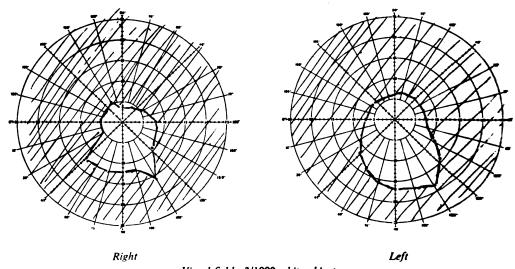
In July and August, 1959, she noticed narrowing of visual fields, dislike of very bright light, and bleaching of hair at temples. The narrowing of visual fields had progressed steadily despite stopping chloroquine in February, 1960, though the bleaching had cleared up. Her skin lesion was aggravated by sunlight. She had no family history of eye trouble, smoked 40 cigarettes daily, and took alcohol

in moderation.

She appeared to walk with undue care. She had chronic discoid L.E. on her face, neck, ears and scalp, with areas of alopecia in her hair, but no evidence of systemic dissemination. General physical

examination was not remarkable. Her blood pressure was 110/75.

Ophthalmic Examination: VR = 6/6 pt. VL = 6/9. Pupils react sluggishly to light, normally to Visual fields grossly contracted (see illustration). Night vision impaired. arteries considerably narrowed, peripheral choroidal vessels and sclera unduly visible, and fine pigmentary disturbance: the appearance is of retinal degeneration.



Visual fields, 3/1000 white object.

Erythrocyte sedimentation rate 6 mm. in one hour; hæmoglobin 14.1 gm. per cent (97 per cent of normal); white blood count 4,800/mm.3 with normal differential; no L.E. cells found; urine and chest X-ray normal; and Wassermann, Kahn and Price's precipitation reactions all negative.

An electro-retinogram and electro-oculogram were kindly done for us by Dr. G. B. Arden at the Institute of Ophthalmology. The following is an extract from his report: "... she now has only a very small central field. It is therefore difficult to perform dark adaptometry, but in what is left of her retina, she has both rods and cones and the final threshold is only about 1 log. unit above normal. Her electro-retinogram is so small that it is impossible to be sure if any is indeed present. Some reduction of E.R.G. is of course expected in a case where there is extensive retinal damage, but I think that in her case one would expect some E.R.G. to be present, if the remaining retina were normal.

"The electro-oculogram (E.O.G.) which measures, I believe, the function of the pigment epithelium is grossly abnormal and shows fluctuations similar to other cases of this condition, fluctuations that I have not found associated with any other pathology. In sum, this lady shows abnormalities to my tests exactly similar to other cases of chloroquine retinopathy, which strongly suggest that

there is a metabolic block in the pigment epithelium."

On the assumption that this was a toxic effect of chloroquine on the retinal vessels, treatment was aimed at improving the retinal circulation. She received Priscol (tolazoline hydrochloride) 25 mgm. three times daily and alcohol by mouth in liberal amounts. She was also placed in an oxygen tent for one week. In addition she was treated with "Intermedine" (Chibret) eyedrops twice weekly, and extract of pituitary pars intermedia, said to be valuable in retinitis pigmentosa. All these measures were unavailing and her visual fields remained unaltered. It was considered unsafe to give her further antimalarials, gold or bismuth, and her lupus erythematosus is now deteriorating badly.

Discussion

We believe that this case is similar to those already reported, and that it is the result of chloroquine therapy. In several other reported cases too, retinal changes have been present without corneal deposits. In spite of the patient being a heavy cigarette smoker, we do not believe tobacco to be responsible for the lesions, nor quinine. We think the prognosis is very bad.

It has been noted above that the incidence of side-effects of chloroquine seems directly related to dosage. The table shows details of chloroquine treatment in six reported cases of retinopathy.

		Duration of treatment in years	Maximum Daily Dosage of Chloroquine Sulphate at any time in mgm.
Wells (1959)		2	200*
Hobbs et al. (1959) (1) (2) (3)		31 23 3	600 300 400
Sternberg and Laden (1959)		41	500
George and Mitchell (1962)		23	600

*Received mepacrine at the same time.

It will be seen that in at least two cases, the dosage has not been high, but that treatment has always been long continued. Chloroquine persists longer in the body than any other 4-aminoquinolines, although they are fairly rapidly eliminated. Berliner et al. (1948) showed that 53 per cent remained in the plasma five days after the last dose. Over a period of years the build-up might be considerable.

Considering the amount of chloroquine consumed all over the world, this dreadful complication must fortunately be very rare. Nevertheless, it is our duty to watch constantly for it. Two particular points emerge. While the gross contraction of this patient's visual fields was so obvious to even the crudest of tests that it would have been almost impossible to miss, the retinal changes were not particularly obvious, especially through the undilated pupil. It would seem common sense that every patient on prolonged chloroquine therapy should have very thorough ophthalmic examination at intervals. Secondly it would seem obvious that courses should be kept as short as possible. If prolonged therapy is necessary, then intervals should be allowed between courses to allow the body to eliminate the drug.



Summary

A woman under treatment for lupus erythematosus with chloroquine developed retinopathy. A review of other reported cases shows that this complication has occurred so far only in patients who have had the drug continuously for two years or longer.

We are grateful to Mr. F. W. Law for seeing this case and arranging examination at the Institute of Ophthalmology, London. The views expressed do not necessarily coincide with his.

REFERENCES

ACADEMIC ACHIEVEMENTS

M.R.C.O.G. Captain P. E. N. SUTER, M.B., M.R.C.S.

D.T.M. & H. Majors G. D. RIDDICK, M.R.C.S., and R. N. EVANS, M.B.; Captains J. J. HUSTON, M.B., J. B. STEWART, M.B., J. R. MARSHALL, M.B., and R. H. McKEITH, L.M.S.S.A.

LETTERS TO THE EDITOR

TRAINING FOR SPECIALISTS

Sir.

In the R.A.M.C. the significance of a higher qualification is over-estimated. Instead of being recognized as a means to an end, the M.R.C.P. or F.R.C.S. diplomas are often regarded as signifying specialist status, particularly when they are acquired many years after qualifying. This is completely contrary to the views of the Royal College of Physicians of London. In 1948 a Committee of Fellows, called upon to report on the significance of the London M.R.C.P., said1:

"In the Committee's opinion membership of the College should signify a knowledge of general medicine that justifies further training as a consultant, and the examination should therefore be a test in general medicine, on a level higher than that required for qualification. It should be taken early in training, normally about two years after qualification, when most candidates will have completed their term as Junior Registrar."

This of course is the significance attached to the membership of any Royal College of Physicians, while the same could be said for the fellowship of any Royal College of Surgeons or equivalent higher qualification. An embryo surgeon of my acquaintance acquired the English F.R.C.S. in 1960, when his record of surgical operations personally performed was: 27 appendicectomies, 2 tonsill- and adenoid-ectomies, 3 inguinal herniorrhaphies, 2 tracheostomies, a retropubic prostatectomy, 18 platings of hip, 3 platings of tibia, 2 sutures of Achilles tendons, 8 sutures of tendons of wrist and hand, a patellectomy, and an excision of radial head! To me that makes frightening reading and indicates the significance of the jibe "Licensed to kill." It will be evident that the membership of any of the Royal Colleges of Physicians is of equal significance and that what is most important is standard training of all trainee consultants of a recognized uniform pattern.

An editorial entitled The Consultant's Diploma in a leading medical journal² as well as letters from a distinguished physician³ and the present President of the Royal College of Physicians of London⁴ would appear to leave no doubt that the examination for the M.R.C.P. of London is in need of review, as indeed is the significance and import of this diploma. Surely these qualifications should be acquired early in a post-graduate's career when his neuronal reserve is greatest, and he should not be permitted to use the coveted letters after his name until he has satisfied his college that he has undergone and completed training, to a standard sufficient for the status of consultant to be conferred upon him?

The R.A.M.C. may be thought to have the facilities for the training of its own specialists in preventive medicine (Army Health), but all others of consultant status should be recruited ready-made from civil life, having progressed to maturity on the recognized ladder up which all consultants should have passed. Eligibility for appoint-

¹Lancet (1948) 2, 252.

²Brit. med. J. (1962) 1, 459. ³ACHESON, E. D. ihid. 469.

⁴PLATT, R. ibid. 470.

ment to the chairs of Military Surgery or Medicine in the Royal Army Medical College should not depend on what recognized consultant's diploma the candidate may hold. The R.A.M.C. is a Corps of the Army of the United Kingdom, and the United Kingdom is the Mother Country of the Commonwealth and Empire. There must be no closed shop when it comes to eligibility for certain appointments in the Army Medical Services. It is not the tie that a physician or surgeon wears or the diploma that he has acquired that makes him a capable consultant, but the quality of the man, his character and his competence. Let the best man, irrespective of race. creed or origin of diploma, get the job. The broad principles of officer career structure outlined by Mackay-Dick⁵ could be used as a guide in making the R.A.M.C. a Corps in which frustration should be minimal.

I am, etc.

MANU FORTI

MEDICINE ON THE ROCK

From Colonel R. St. John Lyburn, M.D., F.R.C.P.(I.), D.P.H., D.R.C.O.G.

Sir,

In an effort to broaden the experience of Service Medical Officers in Gibraltar, certain arrangements have been made with excellent results. Perhaps the highlight is the weekly ward round on Saturdays at King George V Hospital conducted by Dr. J. J. Giraldi, M.D., F.R.C.P.(Edin.), Clinical Adviser in Medicine to the Colonial Government. This lasts two hours and is well attended by medical officers of the three Services. The patients are mostly of an age group not normally seen in the Services, and with the teaching are up to membership standards. Clinics are suspended in the Military Hospital on Saturday mornings to enable all medical officers except one, who remains on duty, to attend. The normal ward rounds are conducted later in the morning. Medical officers, particularly specialists, are encouraged to attend the Colonial Hospital to get further experience in their specialties. With a little re-adjusting of operating days and clinics at the Military Hospital it has been found that these medical officers can attend a regular session in their specialties at least once a week.

Another successful feature is the organization by Medical Branch, Fortress Headquarters, of an Annual Refresher Course for the Combined Defence Medical Services and Medical Practitioners in Gibraltar. Our 1961 course ran as follows:

Monday, 29th May: (King George V Hospital) 8.30 p.m. lecture: Treatment of Hypertension, Dr. Giraldi. 9.15 p.m. film: The Cardiac Patient in Stress. Tuesday, 30th May: (Colonial Hospital) 8.30 p.m. lecture: The Acute Abdomen, Dr. Toomey. 9.30 p.m. film: Acute Abdominal Problems. Friday, 2nd June: (Military Hospital) 8.30 p.m. lecture: Diagnosis and Treatment of Common E.N.T. Conditions, Mr. Scott Stevenson. 9.30 p.m. lecture: "Calling the Laboratory," Dr. Imossi. Saturday, 3rd June: (King George V Hospital) 9.15 a.m. Ward Round. Sunday, 4th June: (Colonial Hospital) 11.15 a.m. Ward Round. Monday, 5th June: (King George V Hospital)

⁵MACKAY-DICK, J. (1961) Lancet 2, 1091.

8.30 p.m. lecture: Common Pædiatric Complaints in Gibraltar, Dr. Triay. 9.15 p.m. lecture: The Dangerous Drugs Act, Sergeant Dodd, R.A.M.C. 9.30 p.m. lecture: Common Eye Troubles, Major Milne, R.A.M.C. Tuesday, 6th June: (Military Hospital) 8.30 p.m. lecture: Notable Advances in Medical Treatment, Lieutenant-Colonel Pearce, R.A.M.C. 9.30 p.m. film: The Jugular Venous Pulse. 10.30 p.m. discussion: Medical Treatment. Friday, 9th June: (Colonial Hospital) 8.30 p.m. lecture: Uterine Hæmorrhage, Dr. J. M. Hastings. 9 p.m. lecture: Cardiac Arrest and Artificial Respiration, Captain Nicholas, R.A.M.C. 9.15 p.m. film: Diagnostic and Therapeutic Advances in Liver Disease. Saturday, 10th June: (King George V Hospital) 9.15 a.m. Ward Round. Sunday, 11th June: (Military Hospital) 11.15 a.m. Ward Round.

The local branch of the B.M.A. is strongly supported by the Services and frequent clinical meetings are held in the three hospitals. In addition to these B.M.A. sessions, the Military Hospital holds its own domestic clinical meetings, which all medical practitioners and nursing officers are invited to attend. Should it become known that any eminent medical man is visiting the Rock, he is asked to give a lecture on his subject. Almost invariably the answer is "Yes" and a record attendance results. Our last lecturer was Brigadier John Hunt from St. Mary's Hospital on gastroenterology. These measures to broaden the experience of Service Medical Officers have the added advantage of fostering good relations with our civilian medical colleagues, and result in mutual help cheerfully given. They also enable Administrative Medical Officers to keep in line with developments in modern medicine.

FORTRESS HEADQUARTERS, GIBRALTAR. 12th January, 1962.

Sir,

Yours faithfully, R. ST. JOHN LYBURN.

SHORT SERVICE COMMISSIONS

From Lieutenant-Colonel F. W. W. Dawson, M.B., D.P.H., R.A.M.C. (retired)

Looking at things from afar off and possibly through the wrong end of a telescope, it would appear to me that the Short Service system has not turned out as well as its sponsors hoped. I admit it was an expedient. It looks as if it may suffer the fate of most expedients. We regulars joined the R.A.M.C. after a searching interview and a competitive exam. We settled down to make it our career. We fully explored the medical, military and social aspects. We took the rough with the smooth. We looked forward to an interesting life among interesting people with promotion, pension and possibly honours as our reward. Naturally this is not so with our Short Service brothers. I can envisage some of them counting the hours 'til they receive their gratuity. They may even regard their service as a form of purgatory through which they pass to the paradise of panel practice or even to the seventh heaven of Harley Street. They can have only an academic interest in the glorious history of the fighting forces. We regarded temporary transfers to Camps or other Stations as a change. I can realize that under present conditions some might regard them as an interference with their "postgraduate course." I admit that with the evolution of the British Empire into a Commonwealth of Nations we have lost the best of the Stations abroad.



I was a Civil Surgeon in the Bor War. We were very young and very callow. The R.A.M.C. took us in and made the most of us. They gave us all the help they could, we regretted that we were not of them. We were glad that the Government allowed us to wear uniform. I have been sufficiently long in private practice to realize that orderly duty is worse in civil than in military life. Only a few nights ago I was called out of my bath to deal with a severe case of toothache. I miss the professional comradeship of the R.A.M.C.—those happy hours in the Board Room, the wild Irishman with his wild theories refuted by the argumentative Scot, clinched or otherwise by the book dragged from the library shelf. No longer can I enjoy the freedom of the theatre, laboratory or X-ray room of the Military Hospital.

These young Short Service officers should form an efficient Reserve. Should they be recalled, most of them will be glad to be back. As to the solution of the problem, I am afraid I am too old to help.

64 MILL ROAD, WHANGAREI, NEW ZEALAND. 15th December, 1961. Yours faithfully, F. W. W. DAWSON.

THE CONNAUGHT HOSPITAL

From Norman G. Rothnie, Esq., M.S., F.R.C.S.

Sir,

It was with some regret that I recently learned of the passing of the Army Chest Centre—on the 3rd August, 1961, peacefully after twelve years of valiant service to Her Majesty's Forces, at the Connaught Hospital, Bramshott, near Hindhead—so might it have appeared in the press columns. No such widespread publicity attended its demise, however, and the end passed quietly and unnoticed by most of those who had served there. R.G.M's. fitting tribute—one might almost say obituary—in the January Journal p. 8 reminds us of the efficient service the Connaught has given to the Army and, in general, of the important contributions it has made to the tough battle against pulmonary tuberculosis.

I was posted to the Army Chest Centre in 1953. A straggling one-storey hospital situated deep in unrivalled Hampshire countryside; bleak and cold in the winter, but amply compensated for during the rest of the year. An excellent setting for the treatment and convalescence of the thoracic patient. I was to help establish a surgical wing to an already thriving medical centre, which was investigating and treating all varieties of chest affections, especially tuberculous lesions. The flourishing medical team was under the direction of John Mackay-Dick, who had welded together a band of National Service doctors—Jack Elliott, Jack Howell, Graham Morrhall, Denis Jones, David Morgan, Francis O'Grady, Hugh Davis, and later others. All of them contributed to the selection of patients suitable for surgery.

The surgical team was directed by G. Kent Harrison, thoracic surgeon to St. Thomas's Hospital, with J. Laycock, also of Thomas's, as anæsthetist, and myself as resident surgical officer. We were ably supported by a quietly efficient group of Q.A.R.A.N.C. nursing officers, to whom a great deal of the credit is due for the success of the surgical management. A steady stream of patients of all ages and from

many different parts of the globe were successfully submitted to major chest surgery: men from the Home Countries, Malaya and Malta; Korean prisoners of war including the Glorious Gloucesters, and later Gurkhas. The post-operative care of the different races was, at times, trying, but often amusing and unexpected. These surgical patients enjoyed and completed their up-to-date post-operative medical treatment before returning to duty or to Civvy Street.

The Army Chest Centre was in the forefront in pioneering the medical and surgical treatment of the early tuberculous lesion. It is sad to think that this progressive hospital, with its high degree of team work between regular and National Service medical and nursing officers and civilian consultants, is no more. Many Servicemen and ex-Servicemen owe their present good health and ability to perform a normal day's work to the Army Chest Centre.

ST. BARTHOLOMEW'S HOSPITAL, LONDON, E.C.1. 14th March, 1962. Yours faithfully, NORMAN G. ROTHNIE

Sir,

R.G.M. is to be congratulated on his account of the work of the Connaught Hospital, Bramshott (January *Journal* p. 8). I feel, however, that the regular Army senior physicians-in-charge should be mentioned because the manner in which the work of the Army Chest Centre developed and its professional status blossomed was due in no small measure to their sense of dedication, resource and initiative. They were:

Colonel (retired) G. F. Edwards, M.B.E., M.B., M.R.C.P. (1948–1952) now senior consultant chest physician, Leeds.

Colonel J. Mackay-Dick, O.B.E., M.B., F.R.C.P.(Edin.) (May 1952-April 1955 and June 1958-October 1960).

Lieutenant-Colonel S. E. Large, M.B.E., M.A., M.B., M.R.C.P.(Lond.), (April 1955–June 1958). F.R.C.P.(Edin.), D.P.H.

Lieutenant-Colonel R. G. MacFarlane, M.B.E., M.D., M.R.C.P.(Edin.) (October 1960–October 1961).

Furthermore Colonel Mackay-Dick was an official guest speaker at the First Pan-Malayan Tuberculosis Conference held in Singapore in November, 1956, and the Commonwealth Chest Conference held in the Royal Festival Hall, London, in July, 1958, when he was interviewed for B.B.C. and I.T.V. programmes. The Army Chest Centre and staff were featured for ten minutes or so in the I.T.V. programme, Southern Affairs, in May, 1959, and Colonel J. Mackay-Dick was interviewed for Radio Newsreel on the subject of the Gurkha Tuberculosis Scheme. Someone wrote from Chicago, U.S.A., to say how much he was impressed by what the Army was doing for the Gurkhas. Incidentally the decision to have major chest surgery in the hospital was taken by Sir Frederick Harris who was Director-General Army Medical

Services at the time. Everyone was agreed that it should be carried out in the Connaught Hospital, Bramshott, but what was required was financial authority. The long waiting lists for sanatoria at that time, as well as the fact that cases for resection in civil life had to wait as long as two years for their operation, were included in the final argument which produced the necessary authority. Patients treated in the Army Chest Centre included British, West Indians, Pakistanis, Ghanaians, Malayans. Gurkhas, Somalis, and citizens of the Irish Republic. There is much more that could be written about the Army Chest Centre and its work, and those associated with it should be encouraged to add their bit—including Colonel John Crosse who had plans for the Army Chest Centre to be moved elsewhere.

The excellent results were due to team work between the surgeons, anæsthetists and all ranks Q.A.R.A.N.C. and R.A.M.C., not forgetting the hospital Welfare Officers. The debt owed to Sir Geoffrey Todd, K.C.V.O., is acknowledged with gratitude by all who benefited from their association with him.

I am, sir, your obedient servant, CABER FEIDH

M.E.F.—C.M.F. PATHOLOGISTS' THIRD REUNION DINNER

This dinner was held at the R.A.M.C. Headquarter Mess, London, on 4th January. 1962, with Brigadier Sir John Boyd in the chair and 44 members and guests, among them Professor J. H. Dible and Sir Graham Wilson, both of whom served as pathologists in the R.A.M.C. during the First World War, Professor Ian Aird, Dr. D. Evan Bedford, Major-General W. R. M. Drew, Sir Neil Hamilton Fairley, and Brigadier L. R. S. MacFarlane. Sir Graham Wilson was congratulated on the honour of Knighthood conferred on him in the recent honours list. It was also announced that arrangements were being made to have a portrait of Sir John Boyd painted (see Journal January, 1962, p. 25). The idea of having a dinner for pathologists who served in the Middle East and Central Mediterranean theatres of war was first mooted in 1956. A small committee was formed consisting of Brigadier Sir John Boyd with Professor G. Cunningham, Dr. B. Lacey and Major-General A. Sachs as secretaries. It was decided to hold the dinners on the Thursday of the January Meeting of the Pathological Society of Great Britain and Ireland, when this was held in London, and some 80 pathologists who served in these theatres were contacted. The first dinner was held on 3rd January, 1957, and the second on 7th January, 1960, at the United Services Club, and attendances have been about 45. It is interesting to note that twelve of the pathologists who served in these theatres now hold University Chairs of Pathology and Bacteriology. We hope to hold the fourth dinner in January, 1964. A.S.



BOOK REVIEWS

Surgery of Trauma in the Tropics. R. L. BATTEN. London: Edward Arnold Ltd., 1961. Pp. 234. Illustrated. 35s.

The title of this book is misleading and may deter many who would find it stimulating and helpful. Mr. Batten has in short compass produced an outstanding handbook on the management of trauma which should be read by all interested in the care of the injured. Although the West African influence has been touched on, all the methods and practice which he clearly describes apply not only in the Tropics but to any surgeon on his own in an isolated community. Naturally, in a work which expresses one person's views dogmatically, there are points on which one feels constrained to disagree, but they are mainly trivial. Serious omissions are few and far between. In dealing with the paraplegic bladder, he advocates the self-retaining Foley catheter because it is easier to manage in a general hospital than intermittent catheterization with non-touch technique, which as he so rightly says, gives excellent results in specialized centres. It is generally agreed, however, that the Gibbon catheter is more suitable for these cases. In an excellent summary of the treatment of flexor tendon injuries, he perhaps over-simplifies the position and one fears might stimulate inexperienced surgeons to tackle this operation too light-heartedly. In the management of burns, one cannot agree that it is seldom possible to carry out the local toilet without general anæsthesia (p. 174), and it has been shown that systemic penicillin is both safer and a more reliable method of obtaining bacteriostatic concentrations in the exuded serum. The chapter on Anæsthesia, contributed by J. V. Farman, adds merit to a meritorious work; it is extremely practical, and even includes a list of the manufacturers of anæsthetic equipment and their addresses. This practical tone pervades the whole book and Mr. Batten's chapter on the Armamentarium is excellent. The publishers have also excelled in the format and layout of the book; the illustrations are instructive, clear, and so placed that no irritating turning back or cross-reference is needed. The modest price is welcome, as a sharp contrast to the high prices of medical books. Mr. Batten is to be congratulated on a lucid, thoughtful and comprehensive work, invaluable to the novitiate in the surgery of trauma, and delightful to the experienced surgeon. This book is strongly recommended, particularly to all surgeons in the Corps. One final point: could Mr. Colles please have his appended 's' in 'Colles's Fracture' (p. 82)?

Drugs in Anæsthetic Practice. F. G. Wood-Smith and H. C. Stewart. London: Butterworths, 1962. Pp. vii + 464. 63s.

The authors have successfully set out an account of the physical, pharmacological and therapeutic properties of the multitude of drugs which the modern anæsthetist meets. The drugs are grouped according to their main actions and the purpose for which they are used, and each group is introduced with a brief survey of the physiological, chemical or pharmacological factors involved. The script is lucid and factual, devoid of unnecessary complications and unsubstantiated theory. Synonyms and trade names are given, and an adequate index, so important in a work of this sort, is provided. This is an important book for every student of anæsthetics to read, and it will be invaluable as a reference book for the practising anæsthetist. The modern rate of development of new drugs, and the frequency with which the older ones are discarded or discredited, will make it difficult to keep this treatise up to date. One is tempted to wonder if some form of loose-leaf binding, so popular for Army publications, might not have been more appropriate.

K. F. Stephens

Calendar of the Pharmaceutical Society of Great Britain 1961-1962. London: The Pharmaceutical Press, 1961. Pp. 319. 20s.

This book fully describes the Pharmaceutical Society, and reproduces all the legislation a pharmacist needs to know.

D. G. SARGANT

Textbook of Medical Treatment. Edited by Sir Derrick Dunlop, Sir Stanley Davidson and S. Alstead. Eighth Edition. Edinburgh and London: E. & S. Livingstone, 1961. Pp. 983. 60s. Eight editions in 22 years enable readers to use a treatment while it still works. To turn to a new edition for assistance with such egregious diseases as enuresis, migraine, and chronic allergic rhinitis, would indeed display a triumph of hope over experience. This work is a reference for the inexperienced, provides detail where it may be forgotten, and short discussional accounts by experts where the subjects are difficult or imprecise. Tropical disease, the care of old people, and tuberculosis are perfectly handled. A hallmark of the Edinburgh treatment of diabetes is the use of soluble and protamine zinc insulin one after the other in the morning: the disastrous honeymoon with the free diet is long over. A new section on analgesics makes no reference to Paracetamol; antithyroid drugs are still preferred to thyroidectomy in pregnancy, and quinine has been toppled from its last stronghold as parenteral chloroquine takes first place in the treatment of cerebral malaria. The nitrofurans are inadequately described. Hypertension is inconcinnous among heart disease, and rauwolfia maintains a respectability at St. Andrew's which it is losing elsewhere. Two quotations somewhat sharply wrenched from their contexts: "Vitamin supplements are unnecessary (in tuberculosis)." There is no specific treatment of proved value in human leptospirosis." Indisputably one of the most important works in medicine, this edition is as good as its predecessors.

Wound Healing. Edited by Professor D. Slome. London: Pergamon Press, 1961. Pp. 94. Illustrated

This book is the proceedings of a Symposium held at the Royal College of Surgeons in November 1959. It is unfortunate that the delays of publication cause it to appear after the subsequent conference on the same subject which the reviewer was privileged to attend. Nevertheless, the wide scope of the papers form fascinating reading, not only in detailing the more recent work on wound healing, but also in exposing the vast gaps in our knowledge of this fundamental process. Although the greater part is concerned with animal experiments, there are two excellent papers on the clinical aspects by Mr. Patrick Clarkson and Mr. D. M. Jackson, and Professor D. M. Douglas's paper on the tensile strength of healing wounds in aponeurosis should be read by all who undertake the repair of hernia. In an outstanding paper Drs. J. T. Scales and G. D. Winter describe an experimental study of the adhesion of wound dressings. These experiments were carried out on pigs, whose skin most closely resembles human skin, whereas much of the other work (on rabbits and guinea pigs) may not have much bearing on so dissimilar a mammal as man. Nevertheless, the report on the excellent Symposium will repay the attention of any surgeon.

Essentials of Cardiology. S. G. Owen and J. Vallance-Owen. London: Lloyd Luke (Medical Books) Ltd., 1961. Pp. 201. 25s.

This short new book has been written primarily for undergraduates; but there is abundant fundamental material which, if we are to believe recent observations about the quality of membership candidates, will be of value to more advanced students. Part I for example describes the signs of heart disease and how to conduct a physical examination, and part II goes on to outline the principles of special investigations. There follows a description of general syndromes and treatment, and the final section deals with the varieties of heart disease. There are, to my mind, too many footnotes, but these need not detract from the general text and are probably of value to the junior student. Yes: this is a book which should be a boon to the student; a book which I for one would have bought had I been at the beginning of my career in clinical medicine. But it is too expensive and at the same time too valuable not to be bought. It is the sort of book which should be provided cheaply, even in paperback form. It is a book which every medical student should have.

R. G. MACFARLANE

J. C. A. Dowse

Nervous Inhibition. Proceedings of an International Symposium. Edited by ERNST FLOREY. Symposium Publications Division, Oxford: Pergamon Press Ltd., 1962. Pp. 475. Illustrated. 100s. The concept of nervous inhibition is by no means new, although its mechanism is generally ill understood. In an extremely well integrated series of 31 papers the critical discussion of pre-existing theories in this sphere is helpful, while the relatively new concept of pre-synaptic inhibition is established. This book will provide considerable interest for experimental neurologists, neurophysiologists and biochemists, but little for the general physician.

I. MICHIE

Cambridge Doctor, Rex Salisbury Woods. London: Robert Hale Ltd., 1962. Pp. 224. Illustrated. 21s.

It is said of some that they are "accident prone" owing to the exceptional frequency with which they suffer injuries: it might be said of Doctor Rex Salisbury Woods that he was "incident prone," so many unusual things happened to him, and so many interesting coincidences studded his career. In Doctor Woods this may not be surprising, for he was intimately connected with the life of Cambridge University for over 40 years, particularly in the field of athletics, and with a busy general practice in Cambridge itself he naturally came across a large number of people as students and patients. many of whom were already well known or who afterwards became renowned in a whole host of different callings. What possibly is surprising, until one gets to know Doctor Woods, is his capacity for welding together these incidents into a most readable book. Apart from his own prowess in the athletic world as a shot-putter or rugger player, his dedicated devotion to the affairs of the Cambridge University Athletic Club brought him in close personal contact with almost all the well known athletes of his day, particularly those of Oxford, Cambridge and the American Universities, all the more personal as many of them were also his patients in his busy private practice. He tells this part of his life story in amazing detail, indicative of an astounding memory and a most comprehensively maintained diary. His busy life as a G.P. was interrupted by two world wars. Here again "incidents keep tumbling over themselves; his adventures in France in the 1914-18 war, and in Diego Suarez and Mauritius in the second war make interesting reading, bringing back many a memory to those who shared his problems. The human element is well drawn in the picture of his family life, his wife in spite of many severe illnesses becoming D.D.A.T.S., and his son Tom gaining distinction after being an escaped prisoner of war. Obviously a man of very definite opinions and a life-long adherent of the value of private practice to a G.P., Doctor Woods has some caustic remarks regarding the, to him, very doubtful advantages of the National Health Service. In Chapter 23 he expresses himself with forceful emphasis where he prays for "a National Health Service, more personal, more economical and more in keeping with the old traditions of a great and human profession." This is an autobiography of a remarkable man, splendidly written, which is bound to be of great interest not only to all Cambridge men but to a very wide public. To be topical, it is a "hit."

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Orthopædic Nursing. MARY POWELL. Fourth Edition. Edinburgh and London: E. & S. Livingstone, 1962. Pp. 516. Illustrated. 35s.

This book has an established reputation and the fourth edition is well up to standard. Five chapters devoted to tuberculosis of limbs and joints may seem rather excessive. This disease is, however, still a very serious problem especially in the underdeveloped countries, and serves to illustrate the principles of orthopædic nursing. Many forms of splintage, frames and other appliances are described, and the particular nursing problems are explained. Each surgeon may have his own pet method of treating congenital dislocation of the hip, but every orthopædic nurse has to be familiar with all the methods likely to be used. The junior resident may also find this book of considerable value, with its essentially practical outlook.

D. J. Cowan

Malformations of the Face. D. GREER WALKER. Edinburgh and London: E. & S. Livingstone Ltd., 1961. Pp. 202. Illustrated. 37s. 6d.

The title suggests that this book is confined to the diagnosis and treatment of facial deformities. In fact it deals with the morphological and embryological aspects of all malformations of the head and neck. The author states that when discussing the mechanism of production of congenital anomalies the widest comparisons should be used. This perhaps is the book's main weakness, in that these wide comparisons do not make for easy reading; indeed it is often difficult to understand what conclusions have been drawn. The standard of photography is excellent. A great deal of energy has obviously been spent in obtaining so many unique prints. In these days of chromosomal abnormalities we all must know about congenital malformations. This book, though sometimes difficult to follow, supplies information.

M. CLARK

Medicine—The Diagnosis and Treatment of Prevalent Diseases. FREDERICK WRIGHT and J. C. GOULD. London: Oxford University Press, 1961. Pp. 242. Illustrated. 21s.

This little book has been written for medical auxiliaries working unsupervised in underdeveloped countries. It is simple, lucid and instructive, and should be most helpful under these circumstances.

J. P. BAIRD

Drugs in the Treatment of Disease. Specially Commissioned Articles from the *British Medical Journal*. London: British Medical Association, 1961. Pp. 516. 35s.

The recurring problem of drugs in the treatment of disease is that other people use drugs one has never heard of, cannot recognize on sight, and of which one knows neither dosage nor effects, and the patients come taking these preparations. The Extra Pharmacopæia (Supplement) or the M.I.M.S. (ask the dispenser if you have never heard of this) usually provide the composition or pharmacopæial name, the dosage and a guide to the effects. The volume under review provides a discussion of drugs mainly classified under the diseases for which they may be used. The authors are extremely eminent men; they have of course difficulty in confining themselves solely to drug treatment, and they often display an ill-concealed contempt for the drugs which goes some way to reassure one that one's original ignorance was not culpable.

Elementary Cardiography. E. Noble Chamberlain, Norman Coulshed, and E. L. Rubin. Bristol: John Wright & Sons Ltd., 1962. Pp. 139. 27s. 6d.

This new book is intended for undergraduate medical students and busy practitioners. It is therefore short, elementary, and selective. It deals with four main aspects of cardiology: electrocardiography, phonocardiography, cardiac radiology and cardiac catheterization. For most students the highlight of the book will be the section on cardiac radiology which is well done and abundantly illustrated with radiographs. This section alone makes the book worth while. The chapters on electrocardiography state the principles and illustrate the main abnormalities in a straight-forward easy to follow way. This book presents nothing new, nor was it intended to, but what it does do is to present selected elementary information in an elegant manner.

R. G. MACFARLANE

The Spread of Carcinoma of the Bronchus. H. C. Nohl. London: Lloyd-Luke (Medical Books) Ltd., 1962. Pp. 80. Illustrated. 15s.

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IMPORTANT NOTICE

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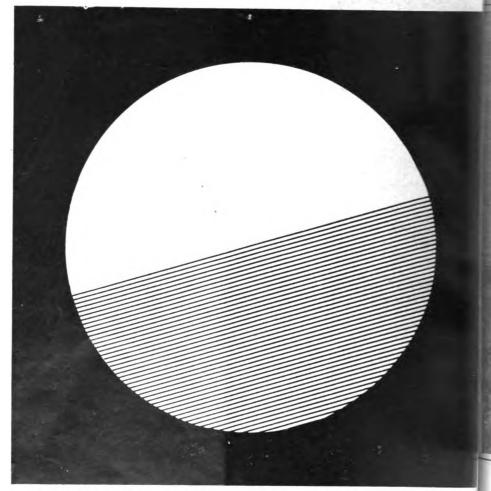
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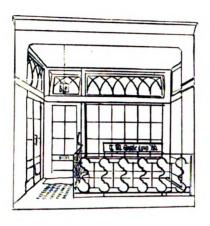
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POPULAR MISCONCEPTIONS

In another part of this *Journal* we publish a letter from Dr. G. H. Robb entitled "The Missing Military Medicos." Dr. Robb has clearly given a great deal of thought to the problem of medical officer recruiting and we thank him for his contribution. Because his letter reveals several misconceptions concerning life in the R.A.M.C. which may well be shared by others, we propose to comment in detail.

Lack of stability. It is untrue to say that an R.A.M.C. officer "does not know from one day to another whether tomorrow might find him on the other side of the world." At present, the aim is to give an R.A.M.C. officer six months' notice of an impending move. This aim is usually achieved, and if it is not, explanations are called for. Of course, when an emergency situation arises overseas a medical officer may be required at shorter notice, but this is the exception rather than the rule. In addition, every effort is made to meet individual desires regarding future postings and modes of employment.

Lack of clinical freedom. "Severe limitation of prescribable preparations." The stock of drugs held by the Army is very wide in its scope and is constantly under review by consultants in the various specialties concerned. Should a medical officer wish to prescribe a preparation not held by the Army he is required to seek the advice of the appropriate specialist, as very often there is an identical preparation having a different name, with which the medical officer is not acquainted, held by the Army. Arrangements of this kind are necessary to obviate the need for the Army to hold stocks of alternative preparations which are not really necessary. In any event, these arrangements cannot be described as "severe limitations."

"Disciplinary action for writing critically of the R.A.M.C. in professional Journals." No such case has come to our notice. But if an officer criticizes the R.A.M.C. in public he must himself expect criticism, including official criticism, from those who hold contrary views. The arrangements whereby a medical officer can express his opinions and grievances through official channels are satisfactory and expeditious. The danger of such expression in public lies in the fact that misinterpretation is likely on the part of those who are not in a position to make a fair appreciation of the case. An organization like the R.A.M.C. is extremely vulnerable to ill-informed criticism and therefore needs protection. R.A.M.C. officers are expected to show a sense of loyalty and of fair-play by making use of official channels to represent their criticisms and grievances, instead of airing them in public. Contrary to what is often believed, the use of official channels in this context does not render the officer concerned liable to disciplinary action.

"Never ending streams of duplicated instructions." It is inevitable that the administration of a global medical service as complex as that operated by the Army should entail a certain amount of paper-work. Many of the written instructions received by

medical officers are for their help and guidance, are welcomed as such and are carfully preserved for future reference. The amount of paper-work in the Army constantly under review with the object of making it even simpler and less time consuming than it is already, and an administrative medical officer is unlikely obtain permission to call for a new report or return unless he can give excelleneasons as to its necessity.

Lack of clinical material. It is untrue to say that Army medicine in peacetime "large boils down to psychiatry and preventive medicine." It must be remembered that overseas especially, wives and children outnumber the troops in many of our military communities, and, therefore, the opportunities for good general practice are excellent There is plenty of scope in military hospitals covering all the specialties; the far that the R.A.M.C. needs to provide a full range of clinical specialists bears witness to this. Although entrants to the Army are selected according to certain minimum physical and mental standards, and although the successes of the Army Healt organization in reducing the incidence of disease have been noteworthy, troops and their families are, nevertheless, just as susceptible to many diseases and injuries a are members of other communities of the same age and sex distributions. In addition the global aspects of military service, with its hazards of tropical diseases, increase the scope of military medicine. Moreover, it must be borne in mind that the wive and children in the military community are not selected in accordance with minimum medical standards and, therefore, are no less susceptible to disease than the wive and children of any other community. It could be shown that there is a greater variety of clinical material in military medical practice than in civilian practice.

Married quarters. Good progress has been made with the Army's programme for building married quarters. There are now large numbers of quarters available and medical officers receive special consideration.

Assistance with boarding-school fees. Boarding-school allowances have existed for some years in the Army. At present these include £150 per annum for the first chike £175 for the second child, and £200 for each subsequent child. When an officer is serving overseas he receives these allowances free of income tax. In addition, when parents are overseas, their children at boarding-school are conveyed at Government expense to join them during school holidays once each year.

Personal relationships. It has been suggested that the relationships between senior and junior officers are unsatisfactory. Criticism of this kind may be levelled at any hierarchical organization, and there must be many who would affirm that these relationships are far more cordial in the R.A.M.C. than elsewhere. In any event the Army Medical Services can claim without fear of denial that there exists between its general practitioners and its specialists, and between its clinicians and its administrators, a spirit of friendship and co-operation seldom encountered in other medical organizations.

THE ARMY MEDICAL SERVICES IN THE FIELD

Major-General A. N. T. MENECES C.B.E., D.S.O., Q.H.P., M.D., F.R.C.P., D.T.M. & H.

Director of Medical Services, British Army of the Rhine

WHATEVER the pattern of land battle in time, place or circumstances, whether in limited or general warfare, the Army Medical Services in the field always have three missions to accomplish: operational, professional and logistic. Hence planning and training must be in three separate disciplines.

Operational Problems

History may repeat itself; war does not. Each new campaign has its own problems. Nevertheless the operational problem still confronting any land force commander is that of moving decisive fire-power to where it can be most effectively used. As new vehicles, weapons, and equipment become available, tactical theory and practice change: it appears likely that the combat zone will be much larger; forward striking forces will at first be deployed by air; mobile groups of armour and infantry, supported by tactical air forces, will concentrate rapidly for attack, deliver an assault, and after effecting a breakthrough, will disperse again.

The combat effectiveness of troops varies with their ability to surmount physical and mental stresses in any part of the world, from the Carribean sea through Kuwait to Korea. Thus in the land battle the operational duty of the medical services will be to assist the commander by ensuring full combat health discipline, as proved in the field studies by Lieutenant-Colonel J. M. Adam and others. One of the greatest supports of morale in the field is the visible presence of a highly efficient medical service.

Professional Problems

When considering battle injury rather than illness, the professional aim of the medical services since the time of Ambroise Paré has been the speedy collection of casualties and their shockless transport to hospitals. There treatment arrests a rapid pathological process and converts it back to the slower, but equally persistent, changes of wound repair. Gamgee, the great Birmingham surgeon, in 1887 stated: "The great antiseptic is life. The living tissues have a natural preservative power, which if guarded and conserved by the surgeon on physiological principles, offers the surest guarantee for healthy repair." But in war even more than in peace, the best is subservient to the feasible. In the words of Sir Heneage Ogilvie, "Efficiency in war surgery means the best possible treatment of casualties, compatible with the winning the war; but if anything is allowed to interfere with military efficiency the lives of well and wounded are risked alike." Hence professional must sometimes be subordinated to operational requirements. The average battle casualty mortality in World War I hospitals of 10 per cent, was reduced to 4.5 in World War II and in Korea (in admittedly exceptional circumstances) to the remarkably low death rate of 2.3 per

cent. This was achieved by the use of helicopters and fixed-wing aircraft, modern resuscitation, newer anæsthesia and traumatic surgery, antibiotics and chemotherapy. Today unquestionably the most important medical unit is the general hospital. Nother can provide the essential round-the-clock services of surgical teams, skilled in the contemporary treatment of trauma, with equally efficient nurses and technicians, and ancillary diagnostic and therapeutic devices, such as the artificial kidney, which will save lives otherwise doomed.

Casualty clearing stations, or their equivalent surgical hospitals, can never rivalence all-round efficiency of the general hospitals, and should only be used for those cases which cannot survive a journey to hospital. Field surgical and transfusion teams, apart from their initial value in air- or beach-heads, should supplement surgeons in hospitals, or in detached portions of hospitals. To obtain the greatest benefit from general hospitals, it is clear that the Army Medical Services must be supported by transport to obliterate the distance between the place of injury and the hospital, eliding as many links as possible.

Logistic Problems

The present trend is towards pre-stocking of heavy equipment, deployment by air in the forward areas of supplementary stocks of critical items, and logistic self-sufficiency of units for several days. While this may be adequate for medical equipment (except for whole blood), it poses grave problems for casualties who require urgent treatment within six hours or so.

At a recent Director-General's exercise, three senior R.A.M.C. officers were discussing the most urgent problem confronting the Army Medical Services. One said the acquisition of broader professional experience. A second argued for the increased recruitment of other ranks. The third declaimed transport! transport! and transport again!

Apart from the efficient medical support, in combat and communication zones. that force which can transport its wounded and sick, quickly and without shock over long distances to properly equipped hospitals, can greatly economize in medical manpower and equipment without impairing the overall logistic plan. Such economies are equally welcome to the operational commander trying to thin out his logistic tail and to the harassed manpower planner confronted with voluntary regular forces after twenty-two years of conscription. The 1962 White Paper on Defence points a way with its emphasis on joint-service task forces. The time has come when air transport must be regarded as the normal method of conveying casualties. In every land battle very close co-ordination with either, or both, the Royal Navy or the Royal Air Force will be essential.

In World War II the largest air-borne operations carried out were conducted by Field Marshal Slim in Burma, from 1943 to 1945, where after a 600-mile retreat before the Japanese Imperial Army, by close co-ordination with air forces the tide was turned and the enemy completely routed. In Burma by using air transport the British Army learned to fight in small isolated groups, to ignore cutting of its communications, to get behind the enemy and to stay there; in general to stick as close to the enemy as possible. In nuclear warfare such tactics would make it impossible for the enemy



to bomb our troops without damaging himself at the same time. When in Burma casualties were transported by air, the reduction in discomfort, time and loss of life can be appreciated by comparison with the casualty in 1942 whose journey from the Arakan Jungle battlefield to a base hospital involved up to sixteen changes of surface transport lasting up to seven days. In 1944 and 1945 the same journey by air involved only three changes and took up to three hours (Meneces 1951). Besides transporting casualties, aircraft can bring in medical disaster teams, as part of area damage control, and critical items of medical equipment. Windgate's advice to the Chindits was "To bring in the goods like Father Christmas down the chimney." But an essential corollary to the use of air transport must be ruthless pruning of nonessential personnel, drastic overhaul of medical equipment, the introduction of lightweight stretchers, blankets and shelters, plastic disposable items, and finally modern packaging techniques. Every ounce needlessly carried reduces the vital aircraft pay-load. Where weather or air inferiority interfere, surface transport will be necessary, say sufficient for 15 per cent of casualties; but each form of transport must be so used as to ensure overall economy of effort.

Future Field Medical Organization

As outlined in the 1962 Defence White Paper, all future operations will be based on the joint-service task force, strong strategic reserves, more air transport, and a bigger naval distribution of ships for such task forces and their support afloat. Although the three Services are to retain their identities, increasing stress will be laid on interchangeability of function and mutual support.

In devising new field medical organizations a joint-service approach will not only improve casualty evacuation, but also bring great economies in manpower, vehicles and equipment. It will be essential to study the overall medical plan for both the combat and communications zones, and to liaise continuously with experts in combat development, logistics and movements theory. The various inter-allied groupings in which the British Army may be deployed, N.A.T.O., C.E.N.T.O. and S.E.A.T.O., will demand standardization of surgical procedures, documentation and medical equipment. Plans will have to be made for cross-servicing of critical items, stretchers, resuscitation equipment and so forth. Finally, in devising any field medical organization most of the following basic data will be essential to balance estimated work-load against the available medical potential.

Operational. The nature of the terrain (obstacles, roads, airfields, water, and so on), the climate (especially any dangers of heat or cold injury), the pattern of battle: airborne, amphibious, special air service, or mixed battle groups. The outline tactical plan. Weapons employed (conventional, nuclear, chemical, and so forth). The likely severity of the fighting. Command, control, intelligence and communications. Allied troops taking part in the field. Area damage control plans. Enemy strength, and combat and logistic potentialities. Civilian population problems, including Civil Defence schemes. Size of our forces: navy, army, air force, allies and civilians. Distance between tactical and logistic echelons. Speed of advance or withdrawal. Dimensions of combat and communications zones. Casualty estimates (conventional, nuclear, injured and sick). Rate of force attrition.

Professional. Health of own forces and allies (immunization, morale, nutrition). Any special health factors or endemic diseases. Efficiency of first-aid training. Battle casualty recovery system. Standard operating procedures for primary assessment of casualties. Hospital facilities available. Casualty documentation. Problems of mass casualties. Decontamination of wounded. Special facilities needed, burns, resuscitation, artificial kidney, neuro-surgery. Casualty estimates, break-

down into types. Distribution in time and space (areas of casualty density). Evacuation potentially air and surface transport. Time taken to transport casualty from initial wounding to definition surgery. Surgical and nursing potential. Ancillary teams. Army Health resources. Numbers organic, attached and supporting medical units. Approximate distances between medical echelons.

Logistic. The overall logistic plan. Logistic command and control. Positioning of logistic instalations. Transport facilities available. Reinforcements and supplies. Cross-servicing with allie Medical supply requirements (especially critical items). Consumption rates. Losses by enemy action Automatic data processing. Reserve packs. Supply mechanism (air, sea, surface transport).

As a background to future land operations certain basic assumptions are made Limited warfare can change to nuclear general warfare in a few hours. A relatively poor equipped enemy can quickly be reinforced by "volunteers" substituting nuclear fe conventional warheads. Tactical land force units in the combat zone will be mobile for about one-third of a day and static for two-thirds. Fuel requirements alone madictate this. At each level (force, corps, divisions, brigade or battle group) th: medical plan must conform to the overall joint-service tactical and logistic plan Joint-service command and staff procedure will provide the up-to-the-minute intelly gence for the medical staff and facilitate efficient planning, command and control Except in limited warfare or against an enemy with air inferiority, it will be uncommon for the majority of casualties forward of the brigade group administrative areas (B.A.A.) to be transported by air. Helicopters are excellent not only for transporting casualties, but also acquiring combat intelligence. Air superiority would be essential to enable air transport of casualties to continue without interruption. nuclear warfare the transport of casualties from locations forward of the B.A.A. will continue to be by surface means (armoured ambulances, armoured personnel carriers (A.P.C.) or flying platforms). From B.A.A. (or rear aid-posts) to communication zone medical units, casualties will be flown by short-range transport (S.R.T.) aircraft, weight-lifting helicopters, or aircraft such as the Avro 748 or de Havilland Caribou. Where Royal Air Force aircraft are used it is reasonable to assume that there will be Royal Air Force Medical Service units, such as casualty air evacuation squadrons (C.A.E.S.) and mobile field hospitals. It is assumed that all ranks of all arms and services possess sound training in preservation of mental and physical health, pretection against nuclear and chemical weapons, efficient first aid for injuries, and basic knowledge of stretcher drill and casualty emplaning.

Battle Group Medical Support

For casualties in combat teams or battle groups, two problems call for study What personnel should be responsible for first aid, collecting casualties and preparing them for evacuation and what forms of transport will be practicable to convey them to hospital? All ranks of all arms and services can supply first-aid treatment and can emplane or load casualties.

If general hospitals, field ambulances and other essential medical units are to be adequately staffed, the number of R.A.M.C. doctors and technicians available for whole-time battle groups will be very strictly limited. Furthermore the unit stretcherbearers available whole-time can never be more than a trained cadre around which other combatants will administer first aid during a lull in the battle. They can then



assist in conveying casualties to the nearest air strip, armoured ambulances or A.P.C. After a nuclear incident casualties might be two or three hundred, clearly beyond the resources of whole-time stretcher-bearers. R.A.M.C. personnel with battle groups should therefore be confined to one medical officer and one sergeant at battle-group headquarters, and one corporal with each combat team.

Assuming that S.R.T. aircraft are flying from B.A.A. rearwards to the communications zone (C.Z.), the ideal transport of casualties from combat teams would be by helicopters with landing strips near battle groups, as in Korea; but those tactical circumstances are unlikely to recur, and transport to B.A.A. may have to be by surface means. Should, however, Army Air Corps aircraft be available for this mission, it is strongly urged that operational control of them remain with the General Staff to ensure establishment of priorities, efficient briefing of pilots, liaison with anti-aircraft defence and so on.

Brigade Group Medical Support

Backing battle groups, field ambulances (or their equivalent) will always be required with each brigade group to provide additional R.A.M.C. personnel and medical equipment to battle group aid-stations; to co-ordinate the collection, sorting and evacuation of casualties from these aid-stations to air strips in the B.A.A.; to provide a medical nuclear reserve, medical teams for damage control, and medical support for brigade units outside battle groups. If adequate air or other forms of casualty transport are available, holding and treating casualties can be reduced to a minimum. To accomplish the above missions a new streamlined air-portable field ambulance should be devised. The exact composition and tactical handling of such a unit should be based on operational research war gaming, field trials, and liaison with combat development, logistic and movements research authorities.

In outline such a field ambulance should consist of a small headquarters and four equal sections. No company headquarters are needed, for they will no longer serve any useful command or control purpose. All vehicles would be armour-protected, capable of carrying casualties, personnel or equipment, fitted with wireless and with anti-inertial mechanism to reduce shock. Such field ambulance transport would increase casualty-carrying potential, while reducing vehicles and would enable field ambulance personnel to work with battle groups whose own personnel are carried in A.P.C. Motor-cycles would be abolished. A possible deployment of such a field ambulance is the headquarters and one section near an air strip at the B.A.A. and the remaining three sections in support of battle groups. Each section should be able to hold and treat a few minor cases for up to three days. There would no longer be any need for casualty collecting posts nor for the present over-elaborate and professionally unjustifiable advanced dressing stations. All casualties would receive efficient first aid, assessment to establish priorities, and transport direct to hospitals. With the much larger combat zone and more intense land operations, there will be no place in the combat zone for static medical units.

For medical support of a parachute brigade in establishing an air-head, a parachute field ambulance is still needed supplemented with surgical and resuscitation personnel, and with modernized medical equipment and vehicles.



Transport between Combat and Communications Zones

Assuming that in future land operations based on joint-service planning brigade groups will be mainly supplied by air from the forward (or rear) maintenance area, these aircraft may be used to transport casualties from air strips in B.A.A. to air strips near the forward maintenance area (F.M.A.). By putting medical installations near both air terminals, and using the air supply radio net, an efficient means can be established to transport casualties to hospitals in the C.Z.

If joint-service planning could include the R.A.F., C.A.E.S. could undertake the emplaning, deplaning, and care during flight of casualties. The C.A.E.S. headquarters could be on or near the forward air strip, and 'A' and 'B' flights on advanced air strips and C.Z. air strips. 'A' and 'B' flights can each detach two portable light sections, and all three flights can hold a few casualties for a short time. The Army would convey casualties to the B.A.A. air strip, and the R.A.F. from there to C.Z. air strips. The transport of Army casualties would be controlled by joint-service staffs through Q(Movements).

Communications Zone Medical Units

These must be able to receive and hold casualties from the combat zone, from incidents in the C.Z. or from area damage control incidents. These medical units must be planned, trained, and deployed to handle mass casualties. The present C.Z. order of battle is unnecessarily complex and should be reduced. The basic unit recommended is a 600-bed general hospital with a small headquarters and three 200-bed elements, each equipped with physicians, surgeons, dentists, nurses and technicians for operating theatre, resuscitation, X-ray and laboratory support. Such a hospital should be able to detach at any time one or two 200-bed elements, transportable by M.R.T. or S.R.T. aircraft. This would eliminate the need for casualty clearing stations or field dressing stations. Such elements could also be located near the boundary between the Corps and F.M.A. Casualties should be transported direct from the B.A.A. to a hospital, but should the terrain or the severity of the battle require it, 200-bed elements could be flown forward to a site say near a refilling point. At this forward element only gravely injured cases could be treated, retained from four to seven days, and then flown back to the main hospital.

Various teams now in the C.Z. medical order of battle could be deleted. Few of them are capable of independent existence, and nearly all rely on larger units for logistic support. It is surely unnecessary to burden joint-service planning staffs with requests for teams such as the field transfusion team with one officer and three other ranks. The headquarters of each hospital should carry specialists, nurses and technicians to include all the teams required. Specialist staffs can always be supplemented by air if needed. The C.Z. medical order of battle can be reduced to: field ambulances (for area damage control); general hospitals: field hygiene sections; pathology laboratory (with a mobile element and research teams); base medical equipment depot (with forward elements); mobile hygiene laboratory (including research teams); mobile dental centres and laboratory, and (for tropical areas) malaria control company, and malaria field laboratory.



Documentation of Casualties

Present methods can be greatly simplified. If name, personal number, religion, and blood group is embossed on the identity disc, a hand-operated addressograph punch at each aid-post and reception department would eliminate hours of writing. Again the primary assessment of casualties would be greatly assisted if on the field medical card an outline human figure were printed. A cross against the part injured would focus attention on the major lesion. All doses of drugs and so on should be in the metric system. There is no need for an admission and discharge book forward of hospitals (or their detached elements). Finally for inter-allied groups special documentary planning will be required.

Medical Stores and Equipment

Some of the factors in planning medical stores and equipment have been mentioned. Statistical data would be especially necessary for critical items. Automatic data-processing will favour provisioning and re-supply. Plastic disposable items, presterilized dressings, and concentration of critical items will greatly diminish the weight to be carried. Thus the S.H.A.P.E. No. 2 pack, containing medical equipment for 100,000 troops for 30 days, can be stored in $25 \times 30 \times 12$ feet, takes less than 800 square feet of space, and can be maintained by two technical storemen. Modern methods of packaging for medical stores, and mechanical handling equipment will reduce manpower requirements. From a base medical equipment depot near the F.M.A. or the rear maintenance area (R.M.A.), M.R.T. or S.R.T. aircraft can fly medical stores to forward depots near refilling points. For emergency supply free dropping can be employed, as in Burma from 1942 to 1945.

Research

Research on health preservation (e.g. reactions to stress), and such problems as wound healing and repair, hæmodynamics and resuscitation, circulatory and metabolic responses to injury, and traumatic uræmia, should be planned on a joint-service (or inter-allied) basis. Teams under the Medical Research Council could be located at hospitals and supported by pathology and hygiene laboratories. The field researches in Korea and Kuwait of Lieutenant-Colonel J. M. Adam on health preservation are excellent examples of practical research of immense value to combat troops.

Training

The triple mission of the Army Medical Services in the field calls for intensive training in the three disciplines. This vast subject calls for separate detailed treatment. In spite of aircraft, new vehicles and equipment, it is questionable whether present standards of field medical training approach those established in the 1920s by the late Major-General Philip Mitchener with his Territorial R.A.M.C. units, field ambulances, and hospitals. Under that eagle eye, stretcher and Thomas-splint drill was carried out as if the patient were gravely injured. Battle deployment was at lightning speed by day and night; Army Health was practised to the degree that any medical unit was itself a demonstration area of hygiene principles. For future combat, training of the Army Medical Services in their operational tasks should include a

thorough knowledge of joint-service planning, command and control of staff procedures, knowledge of the different patterns of the land battle, and a thorough training of junior leaders. Battle drill should not be confined to combat zone medical units, but should exercise C.Z. medical units in area damage control, convoy drill and handling of mass casualties. In professional training the most urgent task today is efficient primary assessment of injuries as practised in B.A.O.R. by means of standard operating procedures. Such procedures will save lives and enhance the efficiency of all medical units. Training in combat health, and in nuclear, chemical and biological warfare problems remains as urgent as ever. The Royal Army Dental Corps and the Queen Alexandra's Royal Army Nursing Corps, apart from their specialist missions, can help enormously as surgical assistants in the handling of mass casualties. Logistic training is rapidly changing, and the future will undoubtedly present a completely different picture from today. Training in this discipline can be most profitable by studying the data suggested above and the newer forms of transport, whether by land, sea, or air.

Conclusion

To accomplish their operational, professional and logistic missions, the Army Medical Services can do their best on a joint-service approach. This will not only enhance professional efficiency, but will greatly economize in manpower, vehicles and equipment. In contemplating the medical problems of future land warfare, it will be helpful to recall the advice of Field Marshal Slim: "The difficult takes a little while to accomplish; the impossible a little longer."

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SOUTHERN COMMAND STUDY PERIOD

It will a very great pity if the manpower position is taken for an excuse not to hold study periods on the usual scale. Apart from the very pleasant social opportunity provided, these exercises surely have adequate military justification in the refreshing effect of learning what so many colleagues have been up to and their thoughts are tending. The Southern Command Deputy Director of Medical Services' Study Period in Bulford this April proved no exception, and must have been a thoroughly enjoyable occasion for all who attended it. General Robinson outlined the theme of the exercise, the medical support of the Strategic Reserve in a limited role overseas; had we



made progress to correspond with that of the rest of the Army? The Brigadier General Staff described the possible patterns of such a war, and asked whether we thought the present medical cover of a battalion sufficient for the new battle group with its greater mobility and spread. The Assistant Director of Medical Services, Lieutenant-Colonel Murison, went over the present concept of medical support for the brigade group of the Reserve, mentioning that one field ambulance in this country would be kept at full peace establishment for this purpose. He thought that an Advanced Surgical Centre sounded too sophisticated and would prefer to describe as an Advanced Dressing Station the unit which would go as close to the middle range transport air-head as was consistent with its noise and dust. From here the Royal Air Force would take over evacuation. He recalled the naval officer who faced with manpower difficulties suggested replacing the doctor, the padre and the paymaster by a medical missionary who could do sums.

Lieutenant-Colonel Adam described the part so far completed of the Army Operational Research Group's five-year programme of research into acclimatization to heat. We were then turned out into the arctic conditions of the parade ground, where 15 Field Ambulance had patiently waited half the morning, this demonstration of their full scale assault being one of their last fixtures before reduction to a small cadre.

Colonel Jeffrey described the indications and methods for transfusion, and noted the difficulty of fulfilling the War Office policy of blood-grouping the whole Strategic Reserve, when its constituent units and personnel were so often changing. Colonel Watts described the mechanism and pathology of bullet wounding. He thought that the methods being developed by Professor Illingworth in Glasgow of treating wounded patients under hypothermia and oxygen at two atmospheres' pressure would, if it could be applied in the field, help enormously by delaying the time which could safely lapse before definitive surgery. This time, he revealed, was now set by the surgeons at six hours so that the administrators might manage twelve. Major Barnes demonstrated some impressive new field packs being developed at Ludgershall, Lieutenant-Colonel Moss-Blundell recalled a cholera epidemic in Ceylon to illustrate Army Health principles, and Major Bell ran through the mechanisms of water discipline.

On the Sunday Lieutenant-Colonel Brodie gave a provocative talk on Army Health problems, particularly the necessity for a light hygiene section to accompany a brigade group at light scales. Colonel W. Stewart presented new ideas on equipment for field medical units, and Lieutenant-Colonel Sugden demonstrated the field surgical team and the type of equipment he thought most suited to its role. Lieutenant-Colonel Stuart demonstrated a rather ingenious device for the production of pyrogenfree fluids in the field and also concluded the Study Period with a talk on medical aspects of nuclear war. We were most lavishly entertained at the Tidworth Officers' Club, where the cold table would have done credit to any establishment of haute cuisine.

D.G.S.





Figure 1.



Figure 2.

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THE TAUNTON SPLINT

HUGH Owen Thomas designed his splint for the treatment of tuberculosis of the knee joint, but in 1915 Sir Robert Jones, consultant orthopædic surgeon to the Army, advocated its use for fractures of the femur. As a result there was a dramatic fall in the mortality due to missile wounds of the femur from nearly 80 per cent in 1914 to less than 20 per cent subsequently. Many modifications to the splint have been produced including half rings, straps and extending leg irons, but all have had to be passed on to the injured limb. As a result the original design has until now continued virtually unchanged.

Recently an improved Taunton splint has been designed by Mr. J. H. Dunn, who is ambulance group officer to the Somerset County Council. This splint presents certain advantages, particularly in the manner of application. The assembled splint is a Thomas splint, but the ring, instead of being made of iron padded with leather, and formerly welded to the leg irons, is of fibreglass in two halves. These engage in holes in metal blocks at the top of the leg irons and are mirror images, meaning that the splint can be used on either leg. Normally three persons are required for fixing the Thomas splint, but if correctly instructed, two men can fix the new splint in a minimum of four minutes. The posterior half ring is gently slid under the buttock distal to the lumbar ischii (Figure 1), and the leg irons are then fitted to the posterior half. Finally the anterior half is attached. The rest of the application is as for a Thomas splint (Figure 2).

Although a skilled team can thread a leg into a Thomas splint with a minimum of discomfort, it is possible at this stage to cause the patient much pain and to increase deformity. All this is avoided with the Taunton splint. In addition the fibreglass ring is more comfortable and easier to clean than a leather-padded ring. It also enables X-rays of the neck of the femur to be taken without removing the splint.

The splint is being studied intensively at the Field Training Centre and it is hoped that it can be suitably modified for widespread adoption by the Army.

J.C.W.

BLOOD TRANSFUSION FOR MASS CASUALTIES

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THE problem of supplying safe blood for mass casualties concerns the Civil Defence organization as well as the Services. This paper discusses the problem from the point of view of the Army, but many of the arguments are in general applicable to civiliar practice.

The present policy for the supply of whole blood in the field is based on the forward distribution principle. The Base Transfusion Unit (B.T.U.) receives blood from the United Kingdom or locally, stores it and delivers it to Field Transfusion Teams (F.T.T.s) which are generally sited with casualty clearing stations or hospitals. The organization of a B.T.U. into headquarters and a company with two forward distribution sections enables a system of mobile blood banks to be established from the base forward, using refrigerated vehicles and trailers. In the past only group 0 blood, checked for agglutinin content, was issued for field use, and this scheme worked very well in the 1939-45 war (Whitby 1953) and in Korea (Crosby 1955). While there is no doubt that the supply of low-titre group O blood from the base is safest in the field and suitable for limited military operations, two major drawbacks can be envisaged in the likely conditions of widespread nuclear warfare: a limit to the supply of blood, and distribution difficulties.

Supply of blood. In civilian practice it has been estimated that the number of injured from a nominal (20 kiloton) atomic bomb exploded over the centre of an average British city would be between 10,500 and 29,500, depending on whether the population was in shelters or houses (Leader-Williams and Smith 1955). It is more difficult to estimate casualties among troops in the field owing to diverse tactical situations of dispersal and protection, but they could be of this order.

Approximately 10 per cent of the British wounded in the 1939-45 war needed transfusion, the average requirement being 2.5 pints of blood per case (Whitby 1953). In the Korean war approximately 20 per cent of all American troops wounded in action were given an average of 4.3 half-litre bottles of blood per patient transfused, or 0.9 bottles per total wounded (Steer et al. 1955). It is hence obvious that the demands for blood in widespread nuclear attack could be extremely large, of the order of 5,000 to 10,000 bottles of blood per nominal atomic bomb, and this demand would arise suddenly. In 1959 the National Blood Transfusion Service (N.B.T.S.) issued 828,594 bottles of blood of which 47.9 per cent were group O (Ministry of Health 1960). Of group O donors 35 per cent are unsafe as universal donors, having agglutinin titres over 1 in 200 (Akeroyd and Crosby 1955). The present potential of the N.B.T.S. could supply approximately 5,000 bottles of low-titre group O blood per week, sufficient to deal with the minimum requirements likely to result from the explosion of a single nominal atomic bomb.

The use of only low-titre group O blood is wasteful of the blood donor panel' only 30 per cent of them being utilized, and it has been suggested by Ackeroyd and Crosby (1955) that if a simple blood-grouping procedure were used, such as that described by Zeitlin (1954) for emergency work, 86 per cent of donors could be usefully bled. This simple procedure uses an anti-A serum only, recipients being hence divided into two groups, "O or B" and "A or AB," who would be transfused with O or A blood respectively. This would almost triple the amount of blood available for field use, but it would still leave the supply woefully short, and the accuracy of grouping with a single anti-A serum under field conditions must be considered before such a procedure can be recommended.

Blood preserved by acid-citrate-dextrose solution and stored at 4° to 6°C has a life of some 21 days. Recently the long-term storage of blood (for years) by freezing has been explored, and two main methods have emerged. If red blood cells are washed and then glycerinated, freezing can be relatively slow and 82 per cent of cells have remained intact after storage for up to 44 months (Haynes et al. 1960). This method has been put into everyday use at the United States Naval Hospital, Chelsea, Massachusetts, but it requires six workers with two fractionators to produce 200 bottles of transfusable blood per month. Before use the cells have to be thawed, deglycerinated and reconstituted in an appropriate diluent, and the considerable manpower and apparatus required for preparation and reconstitution make it unlikely that the method will become applicable to mass stock-piling of blood. The second method is to freeze blood over a few seconds by a liquid gas, such as nitrogen, hæmolysis being prevented by the addition of sugars (Meryman and Kafig 1955) or other suitable substances. These additives need not be removed before transfusion, and excellent results have been claimed, 80 to 90 per cent of cells being recovered after storage for two years (Strumia et al. 1960). There appears little doubt that blood could be safely stock-piled in large quantities by this method, only thawing being required before use. Both these methods for the long-term storage of blood, however, require refrigeration at temperatures ranging between -80° and -180°C, and arrangements for storage at such low temperatures would be difficult except in base areas: thawed blood would be supplied to forward areas and has a life equivalent to that of blood stored by present methods. If the initial supply of blood were the chief stumbling block to the provision of adequate quantities for mass casualties, the stock-piling of frozen blood could answer the problem, but the second major drawback, distribution difficulties, requires consideration.

Distribution. If there is a major war in the future we may face a setting different from that of warfare in the past. It may well be that heavy nuclear strikes would be directed against the United Kingdom. The demand for blood for civilian casualties will be a problem just as great as, probably much greater than, that for the Army in the field. The collecting and sending organization at home may well be disrupted, air transport may not be available or aerodromes may be unusable. External sources of blood supply to an army in the field cannot be relied upon.

It is probable that in any future war events will move swiftly, and it is unlikely that a B.T.U. could be in position (and at work) in time to organize local collection of blood. Disruption by nuclear strikes in the lines of communications may well

make the forward distribution of blood by road impossible. Air lift, for examps by helicopters, depends on availability of machines, suitable weather conditions are refrigeration facilities (for example insulated boxes with ice inserts). These communication difficulties may prevent early evacuation of wounded to rear areas; so that we may be faced with large numbers of casualties who cannot be evacuated immediately and who in many cases will require emergency surgical treatment including blood transfusion, but we may not be able to rely on supplies of blood being available through conventional channels. It follows inevitably that an alternative method of supply must be arranged if blood is to be always available in forward areas, and a realistic assessment of the problem of blood transfusion in nuclear war must accept the possibility, indeed the probability, of procuring blood locally in mary instances as an alternative to no blood at all. Such a policy requires consideration of the technical procedures necessary to ensure that transfusions are safe, of the source of donors, and of staff and equipment for collecting and storing blood.

Technical procedures. The hazards of blood transfusion are such that in peacetime numerous authors rightly stress meticulous laboratory control, including ABO and Rh grouping of recipient and donor and elaborate cross-matching tests. In forward areas in war, or in emergencies such as major natural disasters or accidents, these may not be possible, and it has been accepted in the past that transfusion requirements in such circumstances can be met relatively safely by the use of low-titre group O blood. If, however, the supply of this is impossible, then the use of locally obtained homologous ABO blood could meet the demand and obviate dangers from hightitre agglutinins in heterologous blood of a compatible group, provided grouping of both donor and recipient was accurate. The Rh group can be ignored with reasonable safety for emergency transfusions in forward areas, for it is unlikely that many men fit for service anywhere will have received such transfusion in the past as to possess Rh antibodies. No doubt a number would then be sensitized to Rh antigens, but future transfusions will be in all probability in hospitals where normal pre-transfusion procedures can be carried out, the sensitized recipient discovered and appropriate blood obtained. Female Rh negative personnel, however, must be given Rh negative blood in view of the next generation, and the problem of prevention of Rh sensitization is a very considerable one from the point of view of Civil Defence arrangements for blood transfusion. Two general methods of blood grouping are available, either pre-grouping, or local grouping at the time of donation and transfusion. The crux of the matter is, how accurate are these procedures? This question was re-examined in the British Army of the Rhine in 1959-60.

The scheme was in general to group volunteers under controlled conditions in the laboratory, the samples being identified throughout by attaching the man's identity discs, on which the grouping was eventually stamped. A proportion of the pre-grouped men were then grouped in the field with various methods by several operators. For the laboratory grouping volunteers from units paraded at their medical centres, carrying their two identity discs. These were checked with the man concerned this were not done error could easily arise) and tied to two bijou bottles. Venepuncture was performed a sample of blood taken into each container and, to ease the task of bringing the bottles together again later, each pair of bottles was given the same number serially throughout any one day. In the laboratory one bottle from each pair was given to one of two teams. Grouping for the ABO system was then carried out by the five-tube method (Boorman and Dodd 1957) independently by each team. The group was read by a laboratory technician, checked by a pathologist, then recorded on a strip of cardboard pinned to the special rack provided. The racks from each team were brought together and the results compared (the serial number on the bottles simplified this step considerably). Dis-

crepancies were investigated, the two racks were separated, the discs stamped independently, again the two racks were brought together and if they agreed the discs were removed, tied together, and returned to the unit. A total of 1,129 men were grouped by this method in batches of up to 108 per day. On two occasions anomalous results were noticed only by one team when reading groups, the cell grouping not agreeing with the serum grouping, due to omission of antisera. Such errors are of course obvious when a five-tube technique is used, and they were corrected so that there were no final technical errors. On one occasion the group stamped on the two discs did not tally; this error due to a human factor was noticed because of the duplication of the tests and if there had been only one series of grouping this would have remained as a final error. The various steps in these techniques were timed; it took one technician nearly 15 hours to complete the technical work for 100 men, and washing up the apparatus took one full working day. It is important to realise that it takes nearly three days' work for one operator to group 100 men by this method. The pathologist's time is about seven hours.

Results of various methods of grouping in the field

	Grouping performed by:						
Technique	Pathologists	Laboratory Technicians	Nursing Orderlies with experi- ence in transfusion	Medical	Totals		
Tile ABO grouping Number performed Errors total	81 0	302	283 20	_	666 25		
% total Dangerous as donor % dangerous as donor Dangerous as recipient % dangerous as recipient	0 0 0 0	1.65 5 1.65 0	7.35 16 (a) 5.65 6 (a) 2.12		3.75 21 (a) 3.15 6 (a) 0.9		
Eldon card grouping Number performed Errors total % total Dangerous as donor % dangerous as donor Dangerous as recipient % dangerous as recipient	101 1 1 0 0 1	53 0 0 0 0 0	75 7 9.33 2 2.66 5 6.66	9 0 0 0 0 0	238 8 3.37 2 0.84 6 2.53		
Tile screening with anti-A only Number performed Errors total % total Dangerous % dangerous	110 15 13.6 1 (b) 0.91	285 0 0 0 0	32 0 0 0		427 15 3.51 1 (b) 0.23		
Totals Number performed Errors total % total Dangerous as donor % dangerous as recipient % dangerous as recipient	292 16 5.48 0 0 2 0.68	640 5 0.78 5 0.78 0	390 27 6.92 18 (a) 4.62 11 (a) 2.82	900	1331 48 3.61 23 (a) 1.73 13 (a) 0.98		

Notes: (a) Two errors dangerous for recipient or donor (A called B and vice versa).

(b) All errors except one were failure to read agglutination in A bloods; O blood would be given with little likelihood of untoward effect.

A proportion of these pre-grouped men were subsequently grouped in the field, the work being performed in tents on volunteers lying on stretchers with lighting from a field generator or Tilley lamps. Tests were carried out in sessions of up to 95 men at different times of the day. Blood was obtained by ear puncture and grouping done by a tile technique using anti-A and anti-B serum (Boorman

and Dodd 1957), by a similar technique using anti-A serum only, and in a number of instances by Elder cards (Eldon 1956). These techniques were used at different sessions by various workers (pathosesists, trained laboratory technicians and nursing orderlies who had taken a three-months course transfusion duties). An analysis of the results obtained in this field work is shown in the tabe.

The greatest number of errors, and the major factor in the overall rate of 3.61 per cent, ares on the third day when all workers using wet antisera made a considerable number of mistake. On previous and subsequent occasions the antiserum had been added to a drop of saline on the the and then blood added. On the day in question this saline was omitted and most cases of group a blood failed to give agglutination and were recorded as group O (with A and B antisera) or as group O or B " (with anti-A serum only). All the groups performed on that day by means of Elder cards were correct. Apart from this, the mistakes made by the nursing orderlies were due to reexperience in both technique and reading. The first nursing orderly showed daily percentage error of 19, 15, (29 on the third day), 0 and 3.9. The latter figure was a clerical error, in two consecutive tests one group A being recorded as B and one group B as A. The same inexperience led the second nursing orderly to make 9 per cent of errors on one day, but on the subsequent day when this worker screened with anti-A only, no mistakes arose. The mistakes made by one pathologist were due this attempting to do too much—he performed ear punctures, filled in the record cards and carried out tests with anti-A serum on 51 men in approximately two hours. Inexperience in the technique was the factor responsible for errors recorded by the nursing orderly using Eldon cards; on the four sessions on which he carried out this method the percentage errors were 19, 8.7, 5.5 and 0.

Discussion

It has been stated on a number of occasions that mass grouping of military personnel may carry considerable errors; 10 per cent either technical or clerical in the 1939-45 war (Whitby 1953) and 8 per cent in American troops in Korea (Crosby 1955). A recent review of 80 consecutive donor cards in the possession of Canadiar troops in B.A.O.R. showed eight errors (10 per cent) between the actual and the documented group, five of these (6.2 per cent) affecting the ABO groups (Osborn 1961). On the other hand, errors are rare in the N.B.T.S. for the standard method of testing the serum for antibodies as well as the cells for antigens carries a technical error of less than 0.01 per cent (Boorman and Dodd 1957). Discombe (1955) stated that he could recall only one error in the grouping of blood issued by the N.B.T.S., a group A₂B blood being recorded as group B. It is probable that in mass grouping by a four- or five-tube technique the major source of error is in documentation. Using the five-tube technique and identifying the container of the blood sample by tying on an identity disc at the time of withdrawal carried no final errors when the test was performed in duplicate. It would hence appear that this method of mass grouping is accurate, indeed almost foolproof. Admittedly it is time-consuming, requiring, per 100 men, the full-time services of two laboratory technicians for some three days, and of a pathologist for one day, but it would ensure accuracy

If, however, grouping is carried out locally under field conditions, serious errors may arise. Boorman and Dodd have described the open tile technique as a crude one, with errors of up to 10 per cent in the hands of an inexperienced worker, and even with an expert the rate was at least 1 per cent. In the series of tests reported here, comparatively inexperienced personnel had an error rate of 7.35 per cent, and experienced laboratory technicians one of 1.65 per cent. Of these, 5.65 and 1.65 per cent respectively would cause the men grouped to be dangerous donors, and 2.12 and per cent to be in danger as recipients. Blood grouping in the field by this technique as a method of finding appropriate donors carries a very high rate of potential incompatible transfusion reactions. On the other hand, the safer, simpler techniques such as grouping on open slides including serum against known A and B cells, with

an error of less than 1 per cent, or by a moist chamber technique, with errors less than 0.01 per cent (Boorman and Dodd 1957) are themselves sufficiently complicated to be impracticable under field conditions.

The work of Zeitlin (1954) has already been mentioned. Using slides coated with a potent anti-A serum, he found no false positive results (which could lead to disastrous transfusion reactions) in thousands of groupings. Stewart (1961) found 14.3 per cent errors in a preliminary trial of this method carried out by experienced personnel under field conditions, 12 per cent of which were false positives and hence potentially dangerous. In a subsequent trial using improved lighting and reading the slides against a white background the overall errors were 4 per cent, false positives occurring in 1 per cent. In a final trial using wet serum and carried out by inexperienced men no errors arose. One of the main reasons for the major errors in the first trial was unsatisfactory lighting. In the trials reported here, using a tile technique and wet anti-A serum, a total error rate of 3.51 per cent is recorded, 0.23 per cent being classified as dangerous. No errors were recorded when the tests were carried out by experienced laboratory technicians. Under optimal conditions of lighting, and with personnel adequately instructed, the dangerous errors may be kept to some 0.3 per cent, which, as Stewart rightly argues, it may be justifiable to accept in certain circumstances. But the consolidated results of all trials carried out by Stewart and myself indicate that under adverse field conditions grouping with a single anti-A serum might give rise to dangerous errors of up to 3.3 per cent.

Eldon (1956) described a method of blood grouping by means of cards in which there were panels containing, inter alia, dried anti-A and anti-B serum. Blood grouping was performed directly on the cards at room temperature, the sera being dissolved by the addition of a drop of water and then capillary blood being added, or a saline suspension of cells being used from the start. He reported four ABO grouping errors, but as one gathers that these mistakes came to light only when actual transfusion was contemplated, there appears to be no evidence as to the total number of errors in the 60,000 or so groupings performed by this method. Smith et al. (1955) carried out 85 tests with Eldon cards in parallel with the tube method and reported two ABO errors (2.4 per cent). Stewart (1956) grouped 128 samples in a similar way and found no ABO discrepancies. Pickles (1955) tried out these cards for six months and expressed herself satisfied that this was a valuable addition to blood grouping, particularly suitable for emergencies. Zeitlin (1955) and Drummond (1955) condemned their use. The present series shows an overall ABO error rate of 3.37 per cent, most of these being recorded by an inexperienced worker who improved as he gained experience. No errors were recorded when the test was performed by experienced technicians. Of the total errors, 0.84 per cent would cause the men to be dangerous as donors, 2.53 per cent as recipients of blood. Although most workers condemned the use of Eldon cards, this appeared to be from the point of view of grouping under laboratory conditions. In the field these cards gave results on the whole superior to grouping by the tile method and in field work in emergency (and it is stressed that the Eldon card is *not* advocated for routine peacetime transfusion work) these cards would be of considerable value if local groupings had to be contemplated. They require the minimum of apparatus and are easy to use. While Rh grouping played no part in the work recorded here, it may be noted that the Eldon card contains a panel for D grouping and could be of great value in emergency transfusion work (including the transfusion of women) carried out by the Civil Defence organization.

Source of donors. There are a number of possible sources for local collection, such as disengaged troops, civilian blood banks and donors, refugees, prisoners of war cadavers, and the lightly wounded. It is probably unprofitable to discuss these at length, for the local situation at the time will be the governing factor, and choice of the source of blood should be the responsibility of the local senior administrative medical officer in consultation with the local transfusion officer. Brief notes on the potentiality of these sources follow, but it must be remembered that most of them would not have been pre-grouped.

It is highly probable that civilian blood banks and donors will be required for the treatment of civilian casualties. The psychological and possible physical state of refugees will militate against the likelihood of their being willing to donate blood: prisoners of war are unlikely to be co-operative. Fraser (1957) has discussed the use of cadaver blood in Russia, but pointed out that sentiment, religion or the law precludes the cadaver as a source of blood in most countries. In the circumstances of nuclear war such a source might have to be considered, but would appear to be more applicable to static Civil Defence organizations than to mobile warfare. While under normal peacetime conditions a soldier can donate blood and return to normal duties within a short time, men about to fight would not be at the peak of their abilities in such circumstances, and psychologically it would be bad to bleed a man about to go into battle, so that of disengaged troops only those with comparatively sedentary duties on lines of communications could be considered. The lightly wounded, however. would appear to be a possible prolific source of blood. While it may appear morally indefensible to take blood from a man requiring medical treatment, one can envisage a different attitude in nuclear warfare. The average hæmoglobin level of men in the Army is about 15G/100ml. (Stewart et al. 1957). Under peacetime conditions the Army Transfusion Services require a level of 13.5G/100ml. before a donor is bled; civilian practice generally regards 12.5G/100ml, as an acceptable level (Mollison 1960). The lightly wounded man who cannot fight, who has lost approximately one pint of blood at the most (equivalent to 1.5G/100ml, of hæmoglobin) and who will be kept at comparative rest for some time, will not be jeopardized by the donation of one pint of blood.

Personnel. With present establishments, local collection of blood would require improvisation of a team from units probably already hard-pressed for personnel. Augmentation of a F.T.T. to supply a blood collecting section would appear rational. even with a B.T.U. organization, to cater for occasions when blood cannot be sent forward. Should the principle of forward distribution of blood be augmented by a policy of local collection, manpower for an increased F.T.T. establishment could be found from existing B.T.U.s whose commitments would be thereby lessened. Equipment. With the recent introduction of light, disposable plastic bags with integral taking sets and plastic giving sets, equipment for transfusion no longer presents a problem, apart from initial appreciation of requirements and judicious stock-piling. It is suggested that if every officer and senior N.C.O. in the Army carried a Fenwal

bag or giving set with their first field dressings, the Army in the field would never run short of transfusion equipment. Equipment scales of F.T.T,s include refrigerated trucks and trailers so that means of storing blood are at hand.

Conclusions

- 1. The safest method of transfusion in the field is the supply of low-titre group O blood only. This entails adequate numbers of donors or stock-piling of frozen blood, meticulous laboratory work at the base, and adequate distribution facilities.
- 2. If blood can be distributed from the base forward, but the amount available demands that both group O and A blood be supplied to meet transfusion requirements, grouping of recipients by a single anti-A serum under field conditions might give rise to up to 3.3 per cent of incompatible transfusion reactions.
- 3. Should supplies be inadequate, or should forward distribution of blood not be possible (and on many occasions in nuclear warfare it may not), a high degree of safety could be obtained if the Army as a whole was pre-grouped under controlled laboratory conditions, blood being taken off homologous donors as required. In the situation outlined in 2 above, such pre-grouping would prevent the potential incompatible transfusion reactions.

Pre-grouping should hence be considered as part of mobilization procedure, or could more conveniently be performed as a peacetime routine for the Territorial Army and the Army Emergency Reserve as well as the Regular Army, in view of the time involved. The group should be recorded on identity discs.

4. If blood supplies be inadequate or cannot be distributed forward and if pregrouping has not been carried out, local grouping by simple methods in the field carries a potential rate of 3 to 4 per cent of incompatible transfusions. If, however, local grouping is unavoidable, the choice between simple methods is in favour of Eldon cards, being the less complicated procedure involving less apparatus. These cards have the added advantage of incorporating an Rh test for Civil Defence workers who will face transfusion problems often involving women.

With pre-grouping of the Army, augmentation of a F.T.T. to include a blood-collecting section, utilization of the lightly wounded as donors, and the issue of light, disposable transfusion equipment to certain categories of men, a safe method of transfusion for very large numbers of casualties would be possible, and would be independent of the factors which could lead to breakdown in the present arrangements, such as lack of blood, disruption of communications, or unreliable grouping methods. Is this an over-simplification of the problem of supply of blood for mass casualties? As in so many other spheres the simpler solution is often the better, and it is considered that this conception of the transfusion services in nuclear warfare or for other major disasters is realistic.

Summary

It is argued that arrangements for transfusion services in the field based on the forward distribution of blood will frequently break down in nuclear warfare. Arrangements will have to be made by medical units requiring blood to obtain this locally on occasions, which will probably be the rule rather than the exception. The results

of a series of blood grouping tests under laboratory and field conditions are presented and discussed. It is concluded that a realistic solution to the problem of blood transfusion for mass casualties would be to pre-group the Army as a whokaugment the establishment of a Field Transfusion Team to include a blood collecting section, and make easily available adequate quantities of disposable transfusion equipment, so that local collection and giving of blood can be done without further laboratory procedures.

Work of this nature depends on co-operation, and I am grateful to the Officers Commanding and all ranks of the various units who participated by providing volunteers. The main part of the practical work was carried out by Captain R. A. Carter and Corporals P. A. Holder, J. W. Pilley and J. Keogh, all of the R.A.M.C., to whom my thanks are due.

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CASUALTY EVACUATION IN THE BATTLE OF THE RHINE

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IN March, 1945, the Second British Army was concentrating between the rivers Maas and Rhine for the assault crossing of the latter between Wesel and the Dutch border. The Rhine was the last major barrier to the subjugation of Germany, and the assault proved to be the final major set-piece battle in Europe. For the reception of casualties the Deputy Director of Medical Services (D.D.M.S.), Second British Army, had established a forward hospital group at Venraij, five miles west of the Maas, and this consisted of a 600-bed hospital, two 200-bed hospitals, and a field dressing station. In 14 days over 8,000 sick and wounded were evacuated through this group, and up to 1,100 casualties could have been handled daily. Before the battle the Director of Medical Services had appreciated the co-ordination problem of casualty evacuation by the various available routes and a medical evacuation officer was appointed. After briefing at Headquarters 21 Army Group, the selected officer reported to the D.D.M.S., Second Army, three days before the battle was due to start, and his duties began in earnest at 1800 hours on 24th March, just as the first battle casualties were arriving at the casualty clearing stations. Prior to this time he was required to make a thorough reconnaissance of the area, consider all available facilities for dealing with the injured, prepare an agenda, and organize a conference to which all immediately concerned sent representatives.

Transport for evacuation was made up of ambulance cars and troop-carrying vehicles, ambulance trains, and aircraft. The ambulance cars consisted of two platoons from one ambulance car company, one platoon from another, a duty car at each hospital, and two with the field dressing station, a theoretical total of ninetyfive cars, plus three troop-carrying vehicles for sitting cases. All the ambulances were of the four-stretcher type, and could take a maximum load of 5 lying and 2 sitting, 2 lying and 7 sitting, or 12 sitting. The troop-carrying vehicles could take 20 sitting. Ambulance trains numbered 11, and were scheduled to carry 22 loads between 24th March and 7th April. Their maximum load for each trip was 400 with approximately 270 lying and 130 sitting, depending on the source of the stock. The normal capacity of L.N.E.R. trains was 252 lying and 64 sitting, with emergency expansion up to 294 lying and 106 sitting. The G.W.R. trains would carry 231 lying and 64 sitting and their emergency expansion was up to 273 lying and 127 sitting. The allotment of aircraft was seven Dakotas, specifically used for aeromedical evacuation in the theatre, plus the adventitious use of supply aircraft that might otherwise be returning empty from the forward air strips. Normal carrying capacity of these planes was 18 lying and 6 sitting, but on short flights, with low fuel load, they did take up to 18 lying and 12 sitting, or 30 sitting casualties.

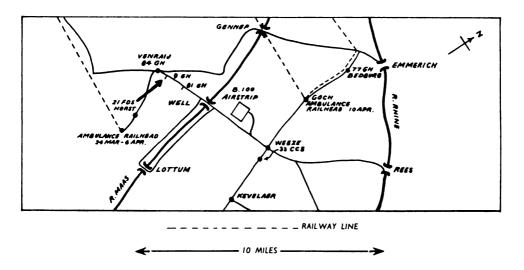
The routes of evacuation varied with the means. Because of the trauma of two

months' battle, road conditions west of Venraij were poor and the route was used only for the less serious cases, such as minor infections, veneral disease, exhaustion (mainly psychiatric disabilities) and convalescent patients. Ambulance trains were scheduled to depart at 1100 hours and 2000 hours daily for communication zora and base hospital areas, the distribution of 22 planned loads being spread over II hospitals. Such was its accuracy that this schedule was sufficient in itself to cope with the evacuation, had weather or other circumstances dislocated other routes. The types of cases preferred for transportation by rail were long-term surgical and medical cases, especially those not acceptable by air route, long-term infectious and psychiatric cases, and such specialized cases as maxillo-facial injuries. The aircraft flew from B100 air strip at Hees to Brussels or Bruges, the casualties then being distributed to neighbouring base hospitals by ambulance cars. Normal flying time was about 45 minutes, and normal altitude was 200-300 feet. By 27th March this service had been extended to include direct flight to the United Kingdom of long-term cases. Neurosurgical cases were flown to a specialist team at the 200-bed hospital at Eindhoven.

Evacuation routes, and within the Army area the destinations of various types of casualties, had already been specifically laid down. So detailed did the proposed sorting appear, that on the eve of the battle it was received with some horror by the hospital staffs. On perusal, however, they realized that the breakdown was only likely to involve four surgical groups; the long-term cases, marked 'Z' for evacuation to the United Kingdom; the shorter-term cases marked 'X' for communication zone and base hospitals (the holding policy laid down was for a maximum of six weeks); the priority air evacuation group which were those requiring urgent further surgery or specialized treatment; and prisoners of war, for whom special administrative measures were obviously necessary. The special cases, the maxillo-facial, neurosurgical, long-term psychiatric, and the infectious, required special documentation and in addition, notification in writing to officers commanding ambulance train or casualty air evacuation section had to be delivered by the ambulance car driver. Minor cases for distribution within the rear army area could be sorted more leisurely unless they became a threat to bedstates. Methods for avoiding confusion in hospital evacuation departments during simultaneous loading of air and rail details had been discussed, and special labels for aeromedical evacuation were issued for the priority cases, but as air availability increased and exceeded rail space, they became unnecessary. The original policy was to use ambulance cars of two different car companies to feed the two main routes. Other points that had been discussed by and with the medical evacuation officer were the need for elasticity in method, and the probability of alteration in arrangements during the progress of the operation, the timings of evacuation by the various routes, the collection, feeding and hygiene of stretcherbearers (mostly locally employed civilians), the exchange and maintenance of stretchers. blankets, and pyjamas, guards for prisoners of war, supervision of psychotics, and locations of and communications with the medical evacuation officer.

The essence of the control of evacuation was the careful and punctual rendering by hospitals and field dressing station of the evacuation state as at 1100/1900 hourdaily, which return was to reach the medical evacuation officer within the next hour

by line or dispatch. This was, in fact, a bid put forward by the medical officers for the movement by appropriate route of those cases in their charge who could and should travel within the next 12 hours or less. On receipt of all bids by 1200 and 2000 hours, the medical evacuation officer could notify his requirements and timings to the ambulance car companies, and inform the hospitals of the numbers accepted in each category. With the establishment of an air cushion of up to 150 beds by a casualty clearing station near Weeze on 27th March, it became possible to offer additional lifts to the hospitals during the course of the day, and to fill the air cushion at night. This was done by accepting additions to the evacuation states by 0700, 1430, and 1830 hours daily, and any remaining space in ambulance trains was also offered. By these means nearly all casualties awaiting evacuation were accepted and detailed for a specific route within an hour of their appearance in the hospital evacuation state. One exception, however, involved 30 prisoners for whom there was no available space in the evening train of 27th March. These could have been cleared by air or road, but because of the guard problem such routes would have involved, it was decided to hold them for evacuation on the following day.



By the end of March the Rhine bridge-head had been consolidated and the breakout had begun. The casualty rate, at its peak on 26th/27th March, when 2,250 casualties were evacuated in 36 hours, had dropped by 29th March to between 500-600 daily. This permitted the gradual closing of the original forward hospital group, and the establishment of a new group near the Rhine bridges and the planned site for the next ambulance train rail-head. One of the 200-bed hospitals was clear of all its patients by mid-day on 1st April, and by 3rd April a new 200-bed hospital had opened at Bedburg, whilst another had opened at Schloss Wissen (the casualty clearing station site near Weeze). The latter then took over the role of air cushion and proceeded to receive the bulk casualties from forward of the Rhine. Deployment

of the ambulance cars required constant re-adjustment because of changing route and the rapid extension of the Corps areas east into Germany. One practical difficulty was the removal of the Bailey bridge over the Maas at Well on the night of 2nd/3rd April, with the drastic effect of permitting only selected priority cases to be moved from the Venraij group to the air cushion. The position was somewhat improved when the bridge at Lottum was made two-way for ambulance cars, but this could not be achieved until 6th April, when it was too late to be of much value, and even so the round trip was a matter of 50 miles. The inflow to the Venraij group had begur to dry up when on 7th April the control and responsibility for evacuation passed to the D.D.M.S., First British Corps, which corps was holding the Rhine bridgehead.

Between 24th March and 7th April, a total of 8,107 invalids were evacuated from Venraij. Of these, 3,626 went by air (64.4 per cent lying and 35.6 per cent sitting): 3,547 by rail (64.4 per cent lying and 35.6 per cent sitting); and 934 by road (37.3 per cent lying and 62.7 per cent sitting).

Discussion

The apparent smoothness of the evacuation was largely due to the fact that much of the personnel involved had the experience of five years of war behind them, and their efficiency compared with that of the early days of the war was remarkable. A brilliant briefing conducted by the Deputy Director of Medical Services, Second Army, on 22nd March, had been most helpful, and all medical and ancillary commanders knew how the battle was to be fought, and how the detailed medical plans would fit in. On the other hand many faults did appear, the avoidance of which had become second nature within units normally concerned with evacuation. The lessons learned remain of value today as always. The appointment of a medical evacuation officer to do the co-ordinating normally carried out by the D.D.M.S. staff at rear army headquarters together with the staff of the ambulance car company headquarters, was something new, and was found of value. The duties of the officer include the receiving and consolidating of evacuation bids, visits to ambulance trains during loading, studying the methods of individual hospital evacuation, liaison with the medical administrative authority, and the notification of medical units in the rear of the casualties they are to receive. When communications are poor, personal contact with the medical air liaison officer, and the air cushion is advisable. Daily hospital visits to take up evacuation problems at the source, for example a doctor's reluctance to evacuate a case of severe burns or a maxillo-facial injury by air, or the time factor as it affects the surgeon's question to operate or evacuate, are also an important duty. For this travelling it will be necessary for the officer to have a driver and vehicle supplied. He will also need a documentation clerk to assist him, for the clerical staff of a working hospital are far too busy during the crucial periods to have extra work thrust upon them.

When a general hospital is employed in a casualty clearing role, then an efficient evacuation department becomes of equal importance to an efficient reception department, each with a selected staff and fully understood drill. A medical officer should be in charge and he should ensure that patients are moved to the evacuation

department in good time for their set evacuation convoy. Failure in this respect could have serious repercussions throughout the railway systems. He must also ascertain that the patient's documents are correct and complete prior to evacuation, and will make good the deficiencies he may discover in this respect, the commonest fault being the neglecting to enter a patient's antibiotic dosage and time of last dose. He will also organize nursing and some simple quartermastering duties, though much of this work may be delegated to an efficient N.C.O.

An efficiently-run evacuation department should be able to take a considerable proportion of cases direct from "Reception" thus saving time, labour and unnecessary re-examination in the wards. Feeding and welfare services should be kept at a high level, and latrine accommodation must not be forgotten. Hospitals where large numbers of casualties are expected must have sufficient stretcher-bearers, and as this is heavy work, a shift system should be adopted. At the same time it should be considered that the larger the hospital, the more dispersed it is, and the amount of labour required for stretcher-bearing is progressively increased. Thus, where a 200-bed hospital may require one section of bearers, a 600-bed hospital may require four sections. Evacuation will be going on at the same time as new convoys of patients are being received and stretcher-bearers will be required for both departments. Civilian labour may be useful, but the terms of their employment must be elastic enough to prevent them "knocking off" work in the middle of an evacuation or convoy reception.

Although ambulance train commanders had been warned that they should be prepared to take up to 400 cases per trip it was not considered practical to fill the maximum space, particularly on an overnight run with fresh surgical cases. A varying proportion of sitting cases that leave the forward hospital will arrive at the base hospital as lying cases, and allowances must be made for this. To occupy the entire floor space of the train must inevitably slow up and interfere with the treatment and attention the occupants require. With effect from 1500 hours on 24th March, when the first ambulance train arrived, the station at Horst-Sevenum was reserved as a medical rail-head. A small "cushion" for 60 patients was established, but was never utilized, as pressure on hospital beds and transport was never too severe. Prisoners of war amounted to approximately 40 per cent of the total casualties evacuated by rail, but no satisfactory provision was made for guarding them, as the hospitals, whose technical responsibility it was, could not afford to provide soldiers for this duty. Usually sitting casualties had to act as guards on the journey.

Aeromedical evacuation is not so straightforward as evacuation by other routes since another service is involved. The R.A.F.'s air strip at B100 was to provide little more than documentation and temporary shelter for a handful of patients. It was later built up to be 'B' Flight of a Casualty Air Evacuation Unit (C.A.E.U.), with improved accommodation and limited facilities for the attention of casualties awaiting emplanement, and a R.A.M.C. Medical Air Liaison Officer became the link between the medical branch of the Second Army and the R.A.F. at the air strip. What the R.A.F. did appear to need were stretcher-bearers, and these duties, together with the responsibility for the handling of blankets, pyjamas and so forth, were undertaken by a Port Detachment R.A.M.C., but this was not sufficient to cope during

rush periods. This is of importance when the air cushion is provided by a R.A.F. unit rather than by an army medical unit, for it remains an army responsibility. Good line communications are also essential for the co-ordination and evacuation of large numbers of casualties. Among the difficulties were the failure of the R.A.F. to man the telephone at all times, the changing of exchange routing without notification, and the low priority that medical lines were given in the exchange. C.A.E.U. flight, whilst at the air strip, had no communication with the airfield at Brussels, and were unable, therefore, to discover when aircraft would arrive. was understood that this was a common factor affecting both the forward shuttle service and the United Kingdom service from the British Expeditionary Force. Local weather conditions and meteorological reports were therefore of little value in reviewing evacuation possibilities; nor was it possible to call aircraft up to meet any unexpected increase in the casualty flow, other than by verbal message via the next plane out. The medical evacuation officer should have some degree of operational control over the ambulance car company platoons made available for the hospital group evacuation. The Second Army medical administrative instruction had laid down that only cars of a specific company would be used for air evacuation, and those of the other company for rail and road evacuation. Because of this the company supplying the platoon for air evacuation was on two occasions reduced to an availability of only two cars because of varying operational commitments. Vehicles were never demanded as such; the platoon officer was notified of the numbers of cases to be collected. and was told the time for collection and the destination, and the rest was up to him to arrange.

The hospitals utilized within the army area were 200- and 600-bed general hospitals which had been made available to act in a casualty clearing role. Some doubt was expressed as to the value of the 200-bed hospitals to an army, as compared with casualty clearing stations, but this was not altogether a fair comparison. The majority of the casualty clearing stations were already battle-trained both administratively and professionally, while the 200-bed general hospitals did not have this advantage. Apart from a mobile prototype tried by the Eighth Army in North Africa. they were a new establishment. In battle the casualty clearing stations were often best used in pairs, receiving alternately, whilst the 200-bed hospital with attached field surgical and transfusion teams had a better sustained surgical potential. Where mobility and all route transport are crucial, then the casualty clearing station is the better unit for an evacuation role. In the Rhine operation the two small hospitals were a useful luxury, and achieved the valuable effect of dispersal within the group in the event of a rocket attack. The field dressing station alongside the 600-bed hospital at Venraij received all light cases from "reception" at the hospital without further documentation and was of considerable assistance on the arrival of large convoys, by providing an immediate "screen" to which the patients proceeded on foot.

It is unlikely that such massive assaults as that of the Rhine crossing will occur in future wars where nuclear armaments may be used, but although the collection of casualties in the forward areas will present new problems, that of evacuation from the forward hospitals may be expected to remain unchanged for many years. The

only new factor since 1945 is the advent of the helicopter, which, if available in sufficient quantity, should be of great assistance in feeding the transport aircraft and in carrying the "special" cases to the specialized surgical teams. Similar problems could arise with civil populations who have been exposed to massive attack, for they would require organized mobile medical forces of a similar nature to those built up during the 1939–1945 war, to move into the sectors around the casualty area to collect, treat and evacuate the wounded. For these reasons I feel that these notes may be of some interest today, both by stimulating thought on the quantity and variety of resources necessary, and as a reminder of the importance of detailed planning and the value of experience in achieving speed and efficiency.

WHO WAS THAT LADY?

Some years ago an epidemic of german measles broke out on the cadet ship H.M.S. Frobisher. It was decided to isolate all patients showing a rash, and to send the rest of the crew home with a letter addressed to the parents as follows, "Dear Sir/Madam, I regret to say that your son has been in contact with Rubella. If he breaks out in a rash, please refer him at once to the nearest naval medical officer or civilian practitioner."

Three days later the following letter was received by the medical officer: "Dear Sir, I am very sorry to hear that my son has been in contact with Rubella. I have given him a good hiding, and have warned him that if this thing happens again I will stop his spending money."

SCHISTOSOMIASIS IN NIGERIAN SOLDIERS

Major H. S. MOORE M.B.E., M.R.C.P., D.T.M. & H., R.A.M.C.

Some 6 per cent of other rank medical admissions from the Royal Nigerian Military Forces (R.N.M.F.) to the Military Hospital, Kaduna (Northern Region), are due a schistosomiasis, and it causes a manpower loss that a small army can ill afford, for each patient is in hospital for investigation and treatment about three weeks. In the three years 1957 to 1959 168 new patients were admitted, so that nearly ten soldieryears were lost. The problem facing the Army recruiting teams, especially in the Northern Region, is reflected in the heavy school-age infection rate of 65 to 95 per cent (Blair 1956), and the present recruiting policy debars entry to those with known schistosomiasis, unless they have a trade or other merit of special value to the Army, such as experience in nursing, clerical or engineering work. These are provisionally accepted, but actual recruitment depends on the results of investigation and treatment in a military hospital.

This policy is based on recommendations which we submitted to the Assistant Director of Medical Services, Lagos, in 1957. It can be criticized on the grounds that it prevents much recruitment from those northern provinces which are politically influential and have close Army connections, that the disease being widespread there is much wastage of otherwise acceptable recruits, and that the risk of chronic bilharzial morbidity in the Army is small. There are, however, valid reasons for continuing this policy. The R.N.M.F. is small and must have a high physical standard throughout Of the many wanting to enlist only a few can be accepted, and these should be free of disease if the Pulheems standard of P2 P.E.S. FE is to be maintained. To recruit men with the disease would raise the number of low-category men, already present due to trauma, acute disease, convalescence and the commendably humanitarian attitude adopted towards those men with tuberculosis and leprosy detected during military service. The economic, military and medical consequences would be enormous if all potential recruits with the infection were accepted. It is possible that after Independence the Nigerian Army may be involved in arduous internal or external security operations*, and the presence of a large number of infected men might prove embarrassing. If the Army has to change its size, status or role, present policy could be amended speedily. We believe the existing policy on recruitment and schistosomiasis to be correct for the present state of the R.N.M.F.

Type of Disease

According to the World Health Organization's Technical Report (1957) the heaviest incidence of *S. hæmatobium* infection is in the northern half of the Northern Region, and this is borne out by the experience of Government medical officers in

^{*} This was written before the Congo crisis.

that area. Scattered foci of S. mansoni occur where S. hæmatobium is also found, but the Eastern Region according to the report is free of both, except for two areas in the Southern Cameroons. Eggs similar to those of S. intercalatum have been reported from Nigeria, but their pathogenicity remains unproven. In our 168 new cases 59 per cent had S. hæmatobium, 20 per cent S. mansoni and 20 per cent mixed infections. The low number of recruits from the areas of heaviest urinary infection biases the figures towards the intestinal form, but with new irrigation schemes increasing snail infestation the latter form will spread, and it is interesting that of 44 cases from an "hæmatobium" area we found 35 with bowel infection.

The Human Environment

The Nigerian is remarkably undisturbed by the disease, fatalistically equating something beyond his control with a belief that hæmaturia is natural to childhood or adolescence. The disease affects an agricultural or fishing community and is aggravated when excretion occurs near open water. In such unhygienic conditions infection inevitably occurs. In northern Nigeria even towns have infected pools or rivers, and the common denominator of all ranks of social life is contact with these waters. Re-infection after treatment is almost a certainty for the soldier on leave. Wells and piped water are increasing but the traditional use of local water dies hard. It is to be hoped that the hygiene taught to the Nigerian soldier will affect his and the community's behaviour when he returns home.

The Effects of Exertion

Physical exertion is widely believed to exacerbate or light up symptoms of schistosomiasis, and it has been suggested that the time to collect urine specimens both for
diagnosis and for test of cure is after exercise. Whether exertion causes ova to
pass more readily through the bladder or stirs up the eggs sedimented in the urine
is not known. The exertion of running three times round the ward perimeter was
sufficient on several occasions to produce ova when ordinary specimens of urine
had been free of eggs. It is hard to believe that this amount of exercise would speed
ova on their way through the bladder wall. Government medical officers agreed
that most patients reported after the hard work of the harvest months. This may not
mean that physical exertion aggravated the disease, but that the patient was economically able to attend only when the harvest was gathered. The Nigerian is a poor
witness when questioned about the onset or severity of symptoms in any particular
season or activity, and with a person to whom one day is much the same as any other,
and a disease which may have waxed and waned over the years, the attempt to obtain
specific information is usually impossible.

Lovett-Campbell (1948) stated that during the war 18 per cent of recruits to the Nigerian Army broke down under the stress of military training, the complaints being backache, cæcal tenderness and mucoid diarrhæa. We found that of 2,300 recruits only 48 (2.1 per cent) produced symptoms during persistent exercise far more strenuous than they had previously experienced. Our impression is that hæmaturia may be aggravated by exertion, but other symptoms such as those noted by Lovett-Campbell were rarely produced. The time of greatest exertion for soldiers



is the dry season from December to April, when military exercises take place. We found that the main incidence of new cases was in the wettest months, July to September, when Army life is at its quietest. A small peak in April could be related to the exercises or perhaps to the stress of Ramadan.

Complications

Almost every organ has been reported to be affected by schistosomiasis. Jopling (1958) gives examples of widespread involvement by aberrant worms or ova deposition, and Alvez (1958) gives a more detailed account of uncommon presentations of the disease. Carter and Shaldon (1959) at the Military Hospital, Lagos, showed by needle biopsy that even in early cases there were histological changes in the liver, but Edington (1959) reporting 600 consecutive post-mortems in Ghana could not connect portal cirrhosis with any particular condition. Smith and Elwes (1934) found only one case of bladder carcinoma associated with schistosomiasis among 500 Nigerians with various malignant tumours, although they often saw signs of Schamatobium infection. Gelfand (1950) concludes from a clinical and histological study that in "the African south of the Sahara" schistosomiasis is not an important cause of vesical cancer, hepatic cirrhosis or cor pulmonale, although he found ova in 56 per cent of cirrhotic livers and 59 per cent of lungs at autopsy on known cases of schistosomiasis. He repeats these views with slight modifications in his book (1957).

In our series of 168 cases, aged from 14 to 40, two had clinical evidence of cirrhosis, and during the three years we saw no cancer of bladder or of bowel in the hospital: none of six patients with hepatoma nor any with pulmonary disease, including one with pulmonary hypertension, had schistosomiasis. No deaths in our series were attributed to the disease. Two of our patients had bilateral hydronephrosis, two had gross ureteric deformity, two showed bladder calcification on X-ray, three had bladder stones, two suffered chronic epididymitis, and one had epilepsy. One case had small hyperpigmented papules in the lumbar region, biopsy of which showed ova of S. hæmatobium (Fig. 1).

Investigations

The following tests were done to confirm the diagnosis and at follow-up to assess results.

Urine and stool tests. At least three consecutive daily specimens were examined for ova in the stools, and for albumen, ova, and cells in the centrifuged urine deposit. Concentration methods which give more accurate results were not used. In several cases at follow-up examination when two urine analyses were normal a third specimen contained many cells and sometimes ova. Gelfand (1950) remarked upon this peculiarity which emphasizes the inadequacy of testing one specimen in assessment of cure. Rectal snips were taken from three sites on the anterior rectal wall. The procedure is practically painless, and occasional brisk bleeding is readily controlled. In S. mansoni infection the mucosa often showed scattered punctate hæmorrhages, and in more severe cases an inflammatory picture with ædema, generalized hyperæmia and excess mucus production. We submitted 109 patients to rectal biopsy and found ova in 82 (75 per cent). Of the 48 cases in which S. hæmatobium ova were found 32 had

ova in the urine, and of 52 positive for S. mansoni only 27 had ova in the stools. Had more refined methods been used to examine urine and stools, these discrepancies might have been reduced, but rectal biopsy is always essential.

The viability of ova in rectal snips was judged on several criteria. Ova dead for any time are dark and often black; soon after death the shell contour thickens and the miracidium becomes granular. Unfertilized ova appear rounder than mature forms, but have well-developed spines. The immature miracidium is a central spheroidal semi-opaque mass, enclosed at each end by a darker semi-lunar mass (Fig. 2). Such ova were often seen in chains in venous radicles, and viable and dead mature ova were usually present. Viable ova were diagnosed on active miracidial movement, flame cell activity or a pencil-thin shell outline containing a well-developed miracidium.

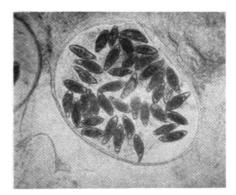


Fig. 1. Dead ova of Schistosoma hæmatobium



Fig. 2. Unfertilized ova of Schistosoma mansoni

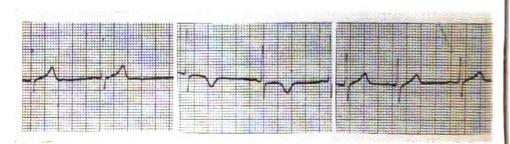
Hatching tests were done only when there was doubt of viability. The technique we believe to be our own. The rectal snips were immediately examined under the microscope. If there was doubt they were put in distilled water and re-examined, when activity or empty egg cases could be seen. This method seemed more reliable and less time-consuming than searching for miracidia in water containing mucosal debris, especially when few ova were present.

Cystoscopy was essential to assess the effect of treatment. Cystitis varied from hyperæmic patches to extensive hæmorrhagic areas. Pure S. mansoni cases often had hyperæmia of the trigone probably due to inflammation extending from involved intestine to the base of the bladder. "Sand patches" are due to mineral deposits in mucosal scars. Tubercles are small yellowish nodules containing ova surrounded by a cellular reaction. They occur singly, in clusters, or in large plaques mainly around the ureteric orifices and the base of the bladder. Papillomata sometimes occur in lobulated and sessile or pedunculated form, and solitary small stones may be found. Kircaldy-Willis (1946) described the cystoscopic findings and mentioned bullous cysts, which we saw in several patients. They look like pale grapes and persist after cure. Gelfand suggests they are caused by blockage and distension of mucosal glands.

Treatment with Triostam

At first, daily intravenous injections were given of 225 mg. Triostam (sodium antimonyl gluconate, Burroughs Wellcome) to a total of 20mg/kg. body weight Later we changed to the scheme advocated by Rowlands (1956), a four-day course of 17–20 mg/kg. body weight using 190 mg. ampoules. Of 120 patients treated in 10 per cent; only once did it cause interruption of therapy, which was continued without ill effect two days later. Mild vomiting occurred in 9.8 per cent, but one patient vomited throughout the course and for two days afterwards, his blood pressure blood urea and urine remaining normal. A widespread, finely granular, pruritic rash affecting mainly the chest and back associated with generalized body pains occurred in 9 per cent. Antihistamines controlled the pruritus. One patient had a coughing attack during an injection. Syncope or faintness were not seen. One patient died three days after treatment.

A 14-year-old recruit seemed well apart from schistosomiasis and a slightly enlarged liver. On the last day of treatment and again the next day there was a fever to 102°F, vomiting and the typica rash; he was given antihistamines. On the third day after treatment he felt generally unwell with body pains and anorexia. His scleræ were slightly yellow and the liver was large and tender, but he was well enough to object to being confined to bed. That evening he collapsed and died. Posmortem histology showed subacute hepatitis and adrenal glands almost completely replaced by fat



E.C.G. Lead V4
Before Triostam therapy

Fig. 3. •
Two days after therapy

Three weeks after therapy

Although only eight patients had electrocardiograms (E.C.G.s) taken before and after Triostam, the findings were so consistent as to warrant mention (Fig. 3). Twenty-four to seventy-two hours after treatment flattening of the S-T segment and deep inversion of the T wave in most leads, especially V₂ to V₄, occurred. The rate, rhythm. P-R interval, and QRS complexes remained unchanged, and no Q waves appeared. Recovery to a normal recording took three to six weeks. No patient complained of cardiac-type pain, nor developed signs of myocarditis. These E.C.G. changes underline the need to treat cardiac cases cautiously with antimonials; the mechanism is unknown but interference with a cardiac enzyme system is possible.

The Problem of Cure

The question of cure in schistosomiasis is a most difficult one; absence of symptoms or ova does not necessarily indicate successful treatment and careful follow-up is

essential. We intended to re-examine patients three months after treatment. This length of time increases the risk of re-infection, but it was chosen to limit interference with military duties, and because, as was suggested at the W.H.O. Conference on Bilharziasis (1959), some worms may be only temporarily harmed by treatment. The three-month follow-up was achieved in a disappointingly small number of cases, but except where re-infection was a factor the longer times proved no great disadvantage.

We applied rigid criteria of failure, even where re-infection was a possibility. The only abnormalities not taken to mean failure were "sand patches" and bullous cysts, and tubercles persisting unchanged at repeated follow-up. In the 98 cases available for re-examination at three months or longer after treatment there were 124 infections of which 86 (69 per cent) were cured.

Results of Treatment

There have been many reports of the efficacy of Triostam. Erfan and Talbot (1950) cured 73 per cent of 30 cases in Egypt; Messent (1954) 56 per cent of 34 cases in Accra; Watson and Pringle (1950) all of 5 cases, and Rowlands (1956) had a cure rate of 83 to 100 per cent in East Africa depending on dosage. These workers generally based their results only on absence of viable ova, and if this looser criterion is applied to our series an 84 per cent cure is obtained. Using our strict criteria of failure 54 of 78 (69 per cent) of S. hamatobium and 31 of 46 (67 per cent) of S. mansoni infections were cured. Of the 35 cases reviewed after three months, i.e. those with least risk of re-infection, our cure rate was 74 per cent. In assessing the value of a drug the severity of side effects and the length of its therapeutic course should be taken into account. Sodium antimony tartrate is toxic and needs a long course, Stibophen, less toxic, also requires a long course, while lucanthone salts cause gastro-intestinal upsets and have a variable effect against S. mansoni infection. Of our patients, 67 per cent suffered no side effects from Triostam, and of those affected the symptoms were mild and short-lived. The only fatality had (pre-existing) gross organic pathology. The short course of Triostam is a great advantage, reducing interference with military duties and economizing in time and money for both patient and medical services alike. In areas where re-infection can scarcely be avoided, repeated long courses of toxic drugs are difficult to justify medically and ethically. Such drugs are used because of their apparent cheapness, but in the long run they may be the most expensive and troublesome.

Treatment with Nilodin

Lucanthone hydrochloride (Nilodin, Burroughs Wellcome) in long courses produces vomiting, prostration, insomnia and yellow discoloration of skin and scleræ. Rodriguez da Silva (1952) in South America used 75mg kg. body weight over four days and noted that coloured patients tolerated the drug better than white ones, and Harris (1952) tried 100 and 125 mg kg. in the then Gold Coast but side effects were too severe. Blair (1958) reports that "no record can be found of any person having died as a result of the drug nor even having suffered any ill effects persisting after the end of treatment." He suggested a total dosage of 60 mg kg. in two equal

doses 24 hours apart, and in a further attempt to shorten in-patient treatment adopted this scheme towards the end of 1959 using Nilodin.

To reduce vomiting we gave 25 mg. of chlorpromazine (Largactil) one hour before and four hours after each dose. Up to the time of this report 21 patients had been treated, of whom 15 were available for follow-up. Vomiting occurred in 62 per cent usually several hours after taking the drug, but never severe enough to cause refus. of the second dose. Commonly there was mild abdominal pain and anorexia lasting 48 hours, transient dizziness, described as light-headedness, and muzziness of hearing The urine appeared darker than normal, but no yellowness of the skin or scleræ was noted, and in the few cases so examined there was no abnormality in the blood picture and liver function tests. Eleven patients had E.C.G.s and eight of these shows: flattening of T waves, with actual inversion in the chest leads in two cases. Acute mental disturbances occurred in four patients. In two there was sudden onset of excited noisy talk and agitated non-violent behaviour, with staring expressionless face and shaking body. Both quietened with sedation and after two days of moody, suller behaviour were normal. We then used promethazine (Avomine) 25 mg. in case chlorpromazine had contributed to this disturbing picture, but two further cases occurred.

A young soldier became suddenly excitable, stamping his feet, shouting that he was about to die and demanding to see the priest. Isolation and sedation were needed for two days and after two more days of sullen and withdrawn behaviour he appeared normal and remembered details of the episode. A woman during the post-therapy E.C.G. became suddenly excited and agitated, rolling on the floor, shouting and weeping. She quietened rapidly with sedation, and after some hours of facile behaviour slept heavily and was normal on waking.

In each case the onset was remarkably sudden some 24 to 36 hours after the second dose of Nilodin; agitation was extreme but no violence occurred. The condition was presumed to be a toxic psychosis. In none of the 21 cases was any ill effect of body or mind reported after leaving hospital.

The same strict criteria of failure were imposed as with Triostam in the assessment of cure. Nine of eleven infections with *S. hæmatobium*, and all ten of the *S. manson* infections were cured. These figures are too small to be conclusive, but they warrant further trial of Nilodin using this dosage. If the remarkable results for *S. manson* infection were confirmed, it would be of importance, as this species tends to be resistant to therapy.

Summary

The incidence, geography, human environment, complications and treatment of schistosomiasis in the Royal Nigerian Military Forces are discussed, together with its effect on recruiting policy. Ninety-eight patients treated with Triostam for four days were re-investigated after three or more months and a strict criteria of failural applied. Of the 124 infections in these patients 69 per cent were cured (67 per cent of S. mansoni and 69 per cent of S. humatohium) and of those reviewed at three months 74 per cent. Thirty-three per cent of patients suffered mild side effects with vomiting fever and rash. Compared with the toxicity and long courses of other antimonius Triostam has definite advantages.

Twenty-one patients were treated with Nilodin, 60 mg/kg. body weight in two divided doses over 24 hours. Of the 21 infections followed up 91 per cent, including all 10 S. mansoni infections, were cured. If these latter results were confirmed in a larger series and the mental side effects prove of no significance, Nilodin in this dosage will be valuable.

ACKNOWLEDGEMENTS

Many R.A.M.C. medical officers have helped to make this report possible. I am indebted to Major D. D. O'Brien and to Captain J. F. Hickey, M.B.E., F.R.C.S.(Edin.), (now at St. Luke's Hospital, Anna, Calabar) for the cystoscopy reports; to successive general duty medical officers and pathologists and to the Nigerian laboratory technicians at the Military Hospital, Kaduna; and to Captain R. Peachey, M.R.C.P., who helped with some of the follow-up investigations at the Military Hospital, Lagos. I am grateful to Dr. L. G. Goodwin, M.B., Ph.D., B.Sc., head of the Wellcome Laboratories of Tropical Medicine, London, for his interest and for the supplies of Triostam and Nilodin, and to the Royal Army Medical College for the photographs.

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THE NEW SOFT HARDWARE?

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MAJOR-GENERAL SIR WILFRED BEVERIDGE

MAJOR-GENERAL SIR WILFRED BEVERIDGE

K.B.E., C.B., D.S.O., M.B.(Edin.), D.P.H.

WILFRED WILLIAM OGILVY BEVERIDGE was born in Edinburgh in 1864, and after schooling in Kensington qualified in Edinburgh in 1887. He was appointed to the Army medical staff in 1890 and served in Hong Kong (during the first out-break of plague²), in India (where he was seconded to the Plague Commission at Poona in 1897), in Bermuda and Canada. In the South African War he was mentioned in dispatches and appointed to the Distinguished Service Order. His experience there of enteric fever convinced him of the importance of prophylaxis,3 and he took the Cambridge D.P.H. in 1904. He worked under Colonel C. H. Melville in the department of hygiene at the Royal Army Medical College, succeeded him as professor in 1912, and was director of hygiene at the War Office from 1919 to 1924. During the war he was on the staff at General Headquarters as Assistant Director of Medical Services (Sanitary), being appointed C.B. in 1915, C.B.E. in 1919, and five times mentioned in dispatches. The unprecedented health of the Army rested largely on the protective measures, at which he worked so hard, of inoculation and water chlorination. He was a joint editor of the Official History of the Great War, in the first two volumes of which he described with modest anonymity his own achievements. In 1920 he was awarded the Chadwick gold medal. He was analyst to the Army Medical Advisory Board and on the Advisory Medical and Sanitary Committee of the Colonial Office. He was especially interested in food and the preservation of rations, and was joint author of A Sanitary Officer's Handbook on Practical Hygiene. He was vice-president of both the Royal Society of Health and the Institute of Hygiene, and he examined for the Conjoint Board. On his retirement from the Army in 1924 he was promoted K.B.E. In 1899 he married Mary Spencer-Walker, who died in 1946. He died at Folkestone on 23rd March in his 98th year. D.G.S.

¹The Times. 5th April, 1962. ²Brit. med. J. (1962). 1, 1080. ³Lancet (1962). 1, 869.

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M.M.D.

THE MYSTERY OF THE HOTTENTOT VENUS

AMONG some papers which belonged to Sir Thomas Longmore, the first professor of surgery at Fort Pitt and later at Netley, lies the fascinating tale of the Hottentot Venus. In order to avoid any possible embarrassment to surviving relatives, names have been omitted.

"It is very funny you and Mrs. de Chaumont asking me of all people in the world for tidings of the 'Hottentot Venus'—you could not have applied to a better source of information, and probably I am now the only one left who knows anything about the lady. It came about in this way. In bygone days, the 'Wee Dobbie' as you know had charge of the Museum at Netley and the 'Venus' was kept under lock and key, hanging in a case, much like a sentry box, which was stored away from curious eyes in a top attick room in the main block of the Hospital. Here Dobbie used to dissect rats, bats, moles and such like vermin in close proximity to the very unique Hottentot specimen. When Dobbie went on leave, the key of the box, and the custody of the lady was frequently entrusted to me, and so I had a very full knowledge of this extraordinary circumstance.

"The specimen was very carefully and skilfully prepared and mounted, and the hands and feet were small and delicate and well shaped—no distortion anywhere—nothing negroid about the features, small delicate features, decidedly pretty, eyes small and brown hair (or wool) seemed a uniform, chignon mass. The skin was smooth and satiny, and of a medium chocolate hue. Apparent age say 22 to 26. She always wore a dark blue, loose, cotton or gingham dress, open all down the front, like a dressing gown, and reaching the ankles. In our day she was shown to few, very few, and only on very privileged occasions. The romance of her life, according to Dobbie was this. She had been the 'Chère Amie' of some medical officer, stationed at the Cape, years upon years ago—she was much beloved by him, and on her death he thought to immortalize her by having her stuffed! She was then brought by the admirer to Fort Pitt and transferred thence to Netley. Where she may be now I cannot say—very likely purloined and lost in moving to Thames Bank, a fatal mistake in my opinion."

Perhaps some reader can throw light on the fate of this extraordinary lady?

'TO PUT THEM IN GOOD SPIRITS . . .'

THERE was a party in the officers' mess with champagne, in the corporals' mess with sherry, and in the privates' messes with beer. Said the C.O.: "The idea is to give a boost to the lads' morale, and it is good for recruiting."

(Recent national Press report)

LETTERS TO THE EDITOR

TRAINING FOR SPECIALISTS

From Colonel J. C. Watts, O.B.E., M.C., F.R.C.S.

Joint Professor of Military Surgery
Royal Army Medical College and Royal College of Surgeons of England

SIR—It is difficult to discover among the mass of fallacious logic expounded by Man-Forti in the *Journal* Vol. 108, p. 91, what is exactly contended; however, the reference to the Chair which I hold compels me to attempt to rebut some of his insinuations.

It is agreed that the M.R.C.P. and F.R.C.S. are now regarded as necessary qualifications for the whole-time physician or surgeon and should be taken early in his career. This is being carried out at least as far as surgeons are concerned, by allowing trainees to attend the Basic Sciences course and sit the Primary Fellowship after attending the Junior course on first commissioning; for the Final examination standards of training laid down by the Royal College of Surgeons are implemented. The fact that the Royal College of Surgeons has recognized certain posts in military hospitals after searching and thorough examination should give the lie to Manu Forti's contention that no facilities for training exist in the Army.

Manu Forti may not be aware that certain international tensions existing from 1939 to 1945 prevented some regular officers from acquiring these diplomata at the larval stage of their careers, compelling them to acquire them when the "neuronareserve" was somewhat diminished but, apparently, still adequate; it is a little ungracious of Manu Forti to jibe at them on this account.

Having agreed that these diplomata are necessary Manu Forti then proceeds to state non sequitur that these diplomata should not be taken into account when selecting incumbents for the Chairs of Military Medicine and Military Surgery which are held jointly at the Royal College of Physicians of London and the Royal College of Surgeons of England respectively; a suggestion that I find difficult to equate with his earlier contention.

He also suggests that consultants should be appointed from civil life; these individuals will have little or no experience of Military Medicine or Military Surgery and it was recognized as long ago as 1802 when the Chair of Military Surgery at the University of Edinburgh was created that these subjects are sufficiently specialized to merit distinction from civilian practice.

Perhaps if Manu Forti had had the opportunity to read the letter from Caber Feidh dealing with the magnificent work of Colonel Mackay-Dick and others in the same issue of the *Journal* before writing to you, he would not be so ready to sneed at the professional attainments of regular officers.

DEPARTMENT OF SURGERY, ROYAL ARMY MEDICAL COLLEGE, MILLBANK, LONDON, S.W.1. 10th May, 1962. I am, Sir, your obedient servant, J. C. WATTS



We showed Colonel Watts' letter to Manu Forti who writes:

It is a matter for regret that it was not made clear that the letter from Manu Forti¹ should have been read in conjunction with the letter from Mackay-Dick² in the *Lancet* as both are complementary. No sneer was meant or implied by Manu Forti. It would appear that John Watts has unwittingly mis-read my letter. If not, then his letter gives the impression that he is evading the points at issue by endeavouring to fight the wrong battle successfully on ground of his own choosing.

You, Sir, appreciate that the reason for my nom de plume is not to provide anonymity but to ensure that the points raised may be discussed dispassionately, without prejudice and without bringing in personalities. As you know you have the liberty to disclose my identity to whoever may care to know it. A similar arrangement has been made by Caber Feidh.

From Lieutenant-Colonel R. G. MacFarlane, M.B.E., M.D., M.R.C.P.(Edin.), R.A.M.C.

SIR—How can Manu Forti hope to recruit consultants in military medicine and military surgery, and allied specialists, ready-made from civil life? Even if the recent so-called "new deal" for Service doctors were to cause established, or about to be established, civilian consultants to seek employment in the Armed Forces, their value without several years of further training would be extremely limited. To be an even adequate Service consultant under present conditions requires a detailed knowledge of the environment and outlook of soldiers and their families; this applies particularly to psychiatrists, physicians and surgeons. It cannot be picked up by working in a hospital; it can be gained only by first-hand experience of soldiers and their families, of their background, and of their working conditions at home and overseas.

Until a "ready made" civilian consultant has spent at least three years as a regimental medical officer, or the equivalent, at home and overseas he would, in my opinion, be unqualified to be an Army consultant. No, the Army consultant must, as at present, be hand picked. He must know the Army before being seconded to civilian hospitals to get the added experience and qualifications necessary for the task for which he has been chosen.

Cambridge Military Hospital, Aldershot. 18th May, 1962.

I am, etc, R. G. MACFARLANE

¹J. roy. Army med. Cps. (1962). 108, 91. ²Mackay-Dick, J. (1961). Lancet, 2, 1091.



A GENERATION STILL LOST?

From Lieutenant-Colonel H. Pozner, M.C., M.R.C.S., D.P.M., R.A.M.C.

SIR—While I found most of your editorial under this heading (Journal Vol. 10 p. 47) interesting, factual and objective, I cannot allow to pass unchallenged somethe observations in the final paragraph which was biased, inaccurate, and what surprisingly expressed tacit approval of the smear campaign against the R.A.M. in the correspondence columns of the British Medical Journal.

Those anonymous letters, occasionally offensive, were remarkably ill times uninformed, achieved nothing worthwhile, and succeeded only in antagonizing the sympathies of those regular officers who had championed the cause of the National Service M.O. It is quite wrong to imply that there was any sort of official director urging the "heavier brass" to answer these juvenile rantings. In the regrettable absence of an efficient P.R.O. for the Corps a few officers came to the conclusional individually that they could do no longer tolerate a vicious misrepresentation of the R.A.M.C. by those least qualified to criticize it and, by all the written indicational least worthy to do so. It was also necessary to point out the confusion in the mindof the malcontents as to the nature of the Corps and the unwelcome controls imposed upon its function and administration by political and economic expediency. The inequalities of medical service should never have arisen, but had they not exist it is almost certain that the most inflammatory of the writers would have found some reason to air their constitutional dissatisfaction with life regardless of the circumstances in which they found themselves.

I question the existence of any real complacency among regular medical officers but I am more intrigued by the use of the word "idealism" as applied to your contemporaries. Having long and carefully observed the Lost Generation at work and play I suggest that idealism was the least apparent of the more admirable qualities its members may have displayed. If you re-read those controversial letters you will find evidence of some justifiable resentment, a good deal of blatant self-interest annoyance at being made aware of personal and professional shortcomings, and adolescent churlishness, but only in a very few instances will you detect the slighter glimmer of genuine idealism to lighten the materialistic gloom. It would appear to be arrogant to assume that idealism in medicine is the prerogative of the recent qualified or anti-militaristic doctor, or that it is implicit in their over-publicized demands for adequate clinical material. At the risk of incurring your displeasure once again as a cynic I can assure you from a close study of the rat-race in civil practice that most of your eager gleaners of examination-fodder are not dedicated to the art of healing for itself but only to the rapid acquisition of a higher qualification as a means of entrée to the next income bracket and more gracious living. youthful friends had every right to aspire to more equitable and congenial Service conditions, but never be gauche enough to mention idealism to them because the know full well that even outside the wicked Army in the Harpole Belt ideals are no acceptable as a down-payment on the Bentley.

Cambridge Military Hospital, Aldershot, Hants, 9th May, 1962. I am, etc., HARRY POZNER



THE MISSING MILITARY MEDICOS

From G. H. Robb, Esq., M.B.

SIR—For a doctor to write on the above subject without having had first-hand experience of the R.A.M.C. may well seem impertinent at first sight. During the past year much has been written by medical officers of all ranks stating why they did, or did not, enjoy their service with the Corps. Very little, on the other hand, has been heard from those who, for one reason or another, have not joined, or do not intend to join the R.A.M.C. In this letter I hope to set out the main reasons why so few young doctors seriously consider the Army as a career. Since I have had no military experience I may well include a number of inaccuracies, but the accuracy of a young doctor's view of the R.A.M.C. is of little importance as far as recruiting is concerned. A doctor will base his decision to join the R.A.M.C. on his own idea of what the Corps is like, and whether this is an accurate or inaccurate idea is beside the point.

This is a time of metamorphosis for the R.A.M.C., as it is for the rest of the Army. For the first time in twenty years the Corps is having to compete in an open market for a relatively scarce commodity, and this will necessitate a fundamental change in the administration of the R.A.M.C. No longer will the service medical chiefs in Whitehall be able to dictate policy without considering the opinions of junior officers; if they do, it will be at their peril, and the numerical strength of the Corps will continue to dwindle. In future the administrators will have to find out from young doctors, both inside and outside the R.A.M.C., what its shortcomings are; and then, where at all possible, to put them right. Judging by recent correspondence on the subject, there appear to be three main objections to life in the R.A.M.C. now that the financial side of it has been improved. These are lack of stability, lack of clinical freedom, and lack of clinical material.

Lack of stability. From the day he is commissioned into the Corps the young doctor has no idea of what the immediate future holds in store. He does not know from one day to another whether tomorrow might find him on the other side of the world. This is all very exciting for a young bachelor, but when he marries, neither he nor his wife will be so keen on that way of life. By the time his children reach school age, it is even more important that he knows what the future holds in store, in order that the children's education may not be unnecessarily broken.

Lack of clinical freedom. This is a shortcoming that is difficult to define. Those who have left the R.A.M.C. come out with stories of severe limitations of prescribable preparations, of disciplinary action if one writes critically of the R.A.M.C. in the professional journals, and of "never-ending streams of duplicated instructions." Although this is rather an abstract shortcoming, it is sufficient to damn the R.A.M.C. in the eyes of many newly qualified doctors.

Lack of clinical material. The prospect of routine examination of fit young men does not appeal to the young, probably idealistic, doctor. Those with serious illnesses would be invalided out and, in any case, the morbidity rate must be extremely low since those with a propensity to illness would not be accepted in the Army in the first place. Thus it appears that Service medicine in peacetime largely boils down to psychiatric and preventive medicine—subjects that are fascinating to a few but uninteresting to most.

This, then, is the problem. What is the answer? In the first place, the War Ofmay well find that they would do better to concentrate on encouraging doctor apply for short service, rather than permanent commissions. If this appeal metal only a moderate response, it would ease the situation considerably, since most of clinical medicine, as judged by man-hours worked, is done by relatively junior rather those who displayed a penchant for military life could then be encouraged to an for a permanent commission.

How then can the short service commission be made more attractive?

First married quarters are a must, and secondly routine medical examination of candidates for the Regular Army could be carried out either by civilian doctor by Army medical officers out of normal working hours. The essential thing that these examinations should be paid for on a per capita basis. As a third per details of some short service commissions could be worked out in advance if it as a case of staffing military hospitals. These posts could then be advertised in the pressional journals and if a grading system, similar to that of the National Head Service were used, it would be easier for those who left the Army to get back to civilian practice. The emphasis would be on the medical rather than the military hospitals.

Three years seems a long time to the newly qualified doctor, and a trial of twelvemonth appointments might be worthwhile. A medical officer, as opposed to these all other branches of the Armed Services, has completed his formal training by a time he signs on and can be of direct value to the Service from the day he is compositioned. These appointments would also enable young doctors to sample militalifie without committing themselves for three years.

Implementation of these suggestions should increase the numbers of those apply for short service commissions. Once the Army had commissioned these people, it wobe up to the R.A.M.C. so to impress them that they would apply for permanent armissions in due course. In this respect much has been promised in recent announdments to ease the lot of the permanently commissioned doctor. However, now to the number of garrisons abroad is to be reduced, it should be possible to plan the in such a way that life in the R.A.M.C. is nearly as stable as life in general praction with the difficulty of providing good secondary education in many of garrisons, it might be worth considering the possibility of providing some assists with boarding-school fees in this country. This naturally is a matter which after officers of all the Armed Services, and is not directly the concern of the R.A.M.

It would of course be necessary in all cases where appointments were plant in detail, to stipulate that, should the international situation demand it, med officers would have to be prepared to go anywhere at any time. Such a stipulate should not unduly affect recruitment figures, so long as it was not abused or them to be abused.

As I have stated at the beginning, I have had no military experience and thereformay have unwittingly misrepresented some aspects of this subject. I make no apole for this, as I believe it is important that senior R.A.M.C. officers should know with medical students and young doctors think about the Corps—be it accurate inaccurate, pleasant or unpleasant. I believe the answer to the present show

of medical manpower in the Army is to encourage the short service commission, since few doctors will take permanent commissions unless they have a foretaste of what they are to expect. Perhaps most important of all is that the higher echelons of the R.A.M.C. appreciate the fact that the Corps is now on a volunteer as opposed to a conscript basis. If the recruitment figures are to improve, the R.A.M.C. must demonstrate that it is virile and progressive and big enough to accept and profit by constructive criticism.

THE ROYAL HOSPITAL, WESTON-SUPER-MARE, SOMERSET. 28th May, 1962. I am, etc., G. H. ROBB

DAMAGING DELAY

From C. E. B. Douglass, Esq.

SIR—In trying to attract young doctors to the Army, the War Office is also discouraging many who would otherwise enlist. What medical student would consider a period in the Army, when those who have gained Kitchener Scholarships and have undertaken to serve five years do not receive their awards? Far more attractive medical cadetships have been promised but despite an announcement early in March no further details have been released. Is this another empty promise? Surely the 30 per cent deficiency of medical officers will not be remedied by such negative tactics. Better relations between the Service Departments and Medical Schools must be established. Better publicity of conditions for Army doctors cannot harm the situation, but deterrents must first be removed.

THE LONDON HOSPITAL MEDICAL COLLEGE, TURNER STREET, LONDON, E.1. 4th May, 1962. Yours faithfully, C. E. B. DOUGLASS

TRAINING IN MEDICAL PROCEDURES

From Major A. C. Ticehurst, M.B.(Lond.), M.R.C.S., R.A.M.C.

SIR—I have been training R.A.M.C. personnel in the 24 procedures devised to deal with mass casualties for some three years, and have demonstrated them to Red Cross, St. John's Ambulance and civilian hospital staff and to Service padres. The form of teaching and demonstration was dogmatic and persuasive, but many searching questions were asked expressing the doubts of the listeners. It was the establishment of answers to these questions and to many self-posed problems which initiated this letter.

The term "24 procedures" should itself be abandoned, since it denotes a finality in our capabilities, and limits progressive development, and the use of denoting letters should also cease, for they suggest finality at 26. A better term would be Basic Support (or Medical) Procedures.



One of the principles of training in the basic support procedures is to use in "ideal" method with the pious hope that in the event trained personnel would a able to devise substitute equipment. It must be accepted that the teaching of masshift methods will lead to haphazard training, but it is certain that the mind of the average medical soldier cannot visualize substitute equipment. I believe that examples of substitute equipment should be included in lessons on the ideal method

The introduction to training pamphlet No. 4 states that trained individual should be preferably formed into teams, and cites one doctor, one nurse and third students. This is fallacious! Men should not be trained in decentralized tasks, for fear of part of the team being destroyed and incapacitating the whole unit. Each meshould therefore be trained in all the basic support procedures. He should be taughthem as a practical drill which could be employed quickly, at any time, in any plant and with total strangers as colleagues. The team must consist of one man!

My more detailed criticisms fall into three groups. There are new procedures be introduced, many amendments, and one procedure, the care of the patient on the Stryker frame, which should be omitted. The frames are not in sufficient supply w disasters, let alone for teaching, nor are they transportable to the scene of a disaster This is a luxury in treatment and one might as well train in the care of a patient an iron lung. I consider amendments necessary where the equipment is too comple or the procedure too slow. The tracheostomy equipment is a luxury, and we must return to the stab method, which was used so effectively in "diphtheria bell" days and will also save precious time. Again the establishment of an intravenous drip in shocked patient with venous collapse is too slow for doctors to do it. It will surely be necessary for medical orderlies to be trained in stab and cut-down methods and regulation of the drip. There are two other necessary amendments of an entire practical nature. One is to take greater care with the greatly admired pre-packs bedding roll, for grievous harm may result from its weight being placed on unknow injuries. The use of plaster back-slabs for fractured legs should also be amende into collateral U-slabs. Back-slabs cannot be applied without implicating the hard of the operator and moving the limb. A U-slab from the origin of the adductor medially to the greater trochanter of the femur laterally, and joined by anterplaster bridges, can be applied without moving the leg and without involving the hands. When the whole cast has set a retaining bandage can easily be applied. To thoraco-brachial plaster is too complicated and should be omitted, being replace by old-type trunk-arm splintage.

The introduction of new procedures would no doubt provoke antagonism, but feel the following are necessary. Trans-nasal endotracheal intubation is necessary the initial care of head and spinal injuries, and can be left in place for 48 hours beformulceration of the laryngeal cords appears. The tube is then usually changed to entithrough a tracheostomy. The cough reflex of unconscious patients is suppress and the tracheo-bronchial tract must be aspirated through the endotracheal tube labelieve the case of a patient with an endotracheal tube should be included in the basic support procedures, and it could easily be extended into care of a patient with intermittent positive pressure respiration with both hand-pumped bags and mechanic respirators.

Another procedure which it seems essential to include is the overall care of the shocked patient. Most people consider the treatment of shock involves initial rest, covering and reassurance until medical aid arrives; hospital workers might raise the foot of the bed. Some patients whose fluid loss has been arrested but not replaced may be in a state of "compensated shock" for many hours awaiting intravenous fluids. The classical feet-high position, though it may raise the systolic blood pressure by ten points, would not be suitable for these long-term cases, since the abdominal contents collapse against the diaphragm embarrassing cardiac and respiratory action. We have developed a nursing position named the trench position to overcome this problem. The legs are raised very high and two pillows are placed under the thorax, the head being lowered on one pillow. This position allows good venous return from the legs with "pooling" in the pelvis, which is low. The abdominal contents do not press against the diaphragm. The cardiac and respiratory action remains unimpaired, and the heart can transmit the venous blood in direct ratio to its minute output without right-sided congestion. The head being low should receive the necessary blood flow. This position is thus physiologically suitable in the long-term treatment of shock. That the unconscious patient should always be attended is another golden rule which I feel may have to be broken through no fault of the nurse. 1 believe that the unconscious patient may be left in a prone position with the foot of the bed slightly raised, excepting cases with rising intracranial pressure.

The points raised in this letter are based entirely upon practical considerations. Other theoretical considerations that have arisen include the need for standardization of equipment among Civil Defence, Services, and indeed all N.A.T.O. countries. Air supplies would then bring in familiar tools to the distressed recipient and he would be able to use them immediately. This would require much planning among the medical hegemony, but its achievement would be a supreme asset "at the end of the day." Quantity of equipment follows standardization and must be thought about soon if we are to salvage anyone from an internecine war. There is also a need now for specialist medical officers who would be responsible only for teaching the procedures and for co-ordination of Service and Civil Defence trainees. These specialists should be able to travel anywhere in the world quickly to gain experience from the "minor" catastrophes of train and aircraft accidents and natural disasters. The care of mass casualties should be as much a specialization in this nuclear age as are thoracic surgery and psychiatry.

19 HAMFLIN ROAD, GORDON BARRACKS, GILLINGHAM, KENT. 4th May, 1962.

I am, etc.,
A. C. TICEHURST

BOWS AND ARROWS

From Lieutenant-Colonel F. G. Neild, M.R.C.S., D.P.H., D.I.H., R.A.M.C.

SIR—It is many years since Negley Farson wrote about an uncle of his who had been under bow and arrow fire in Tibet, so perhaps the Nigerian authorities may be



excused for showing surprise at a report of the use of this weapon during the To disturbances of 1960. Strophanthus was quickly identified as the poison, but medical opinion was slow in agreement over the antidote. The final recommendation was rapid excision of the arrowhead, encouragement of free bleeding and application of methylated spirits. Quinidine tablets gr. 6 six-hourly for 48 hours, and absolute the were also recommended and operational patrols were given the necessary first an sets.

In spite of the alarm caused by the report, a subsequent visit to Mubi, the capit of Sardauna Province, in the old Northern Cameroons, showed that bow and arm injuries were never seen in the hospital there. If the locals were homicidally inclined short-handled stabbing weapons were used. In the Congo, it was found that poison weapons were used for hunting rather than war, and that the commonest poison was a preparation of the glucosides of strophanthin obtained from the dried seeds of Strophanthus kombé (Order Apocynaceæ). On the other hand in certain areas weapons were poisoned with the venom of the black viper, but these are not easy to use operationally, for the arrowheads are dipped into venom at the last possible moments before use.

It may be of interest to record that on 27th July, 1903, at the storming of Burni during the final settlement of the North by Lord Lugard when the ex-Sultan of Sokoto and many other fugitive leaders were killed, Major Marsh of the Royal West Kent Regiment, who was attached to the Royal West African Frontier Force and it the storming party, was struck by an arrow and died later that evening. The Sultan sacred green banner was taken about this time and after being kept for many year at the Queen's Own Nigerian Regiment's museum at Zaria was returned to the presensultan at a colourful ceremony at Sokoto shortly after Independence Day, on 18 October, 1960.

ROOKLEY, CAMDEN PARK, TUNBRIDGE WELLS, KENT. 10th April, 1962. Yours faithfully, F. G. NEILD

ANOTHER LURE?

It is said that the present dearth of medical officers is owing to Irish medical gradates preferring to go to the U.S.A., but this has evidently not been overlooked to our propaganda experts. The Headquarter Officers' Mess at Millbank now take Irish Times. Eire papers please copy.

ACADEMIC ACHIEVEMENTS

Colonel K. F. STEPHENS, O.B.E., F.F.A.R.C.S., has been awarded the Mitchiner Medal for 1962 by the Royal College of Surgeons of England.

Lieutenant-Colonel J. M. MATHESON, O.B.E., F.R.C.S.(Edin.), M.R.C.P., M.D., received the fellowship of the Royal College of Surgeons of England *ad eundem* at a Council Meeting on Wednesday, 13th June. A full account will appear in our next number.

F.F.A.R.C.S. Lieutenant-Colonel J. J. VOLLER, M.R.C.S.

C.M.F.—M.E.F. PHYSICIANS' DINNER

THE C.M.F.—M.E.F. physicians, with some surgeons, anæsthetists and pathologists, held their fifteenth reunion dinner at the Headquarter Mess on Friday, 13th April, 1962, with Dr. E. R. Boland in the chair. The official guests were Lieutenant-General H. E. Knott, Director-General Army Medical Services, Major-General J. C. Barnetson, Deputy Director-General, and Major-General W. H. Hargreaves, Consultant Physician. Sixty-two people sat down to an excellent meal. Dr. Boland, in proposing the health of the guests, recalled that the reunions had started in a small way at Pimm's in Cheapside, and had migrated westward by way of the Apothecaries' Hall and Simpson's-in-the-Strand to their spiritual home, Millbank. He reminded members of the beauties, often veiled, but none the less fragrant and nostalgically memorable, of wartime haunts such as Ben Har Junction, Afragola, and so forth. General Knott replying welcomed the physicians to Millbank and hoped that they would continue to meet there for many years. All present agreed that it was indeed an exceptionally enjoyable evening.

A NEW PLANK FOR THE RECRUITING PLATFORM

"... one of the great advantages of clinical medicine in Oxford is the possibility of meeting people who know no medicine whatsoever."

Oxford Medical School Gazette

BOOK REVIEWS

Henderson & Gillespie's Textbook of Psychiatry. Revised by Sir David Henderson and Ivor R. BATCHELOR. 9th Edition. London: Oxford University Press, 1962. Pp. xii + 578. 42s.

It is rarely that a hardened reviewer is stimulated to re-read with fresh interest and enthuse: a further edition of a long-established textbook of recognized merit. That this is so for this on a tribute to its co-authors and publishers. Always academically impeccable but prone to incits readers a mild intellectual dyspepsia, this book in its new format and comfortably letters. print has now initiated a policy of sensible erudition and readability. It has been carefully result in the light of current trends, the traditional case histories have been pruned, and interesting to material, particularly that on sexual anomalies and recent developments in drug therapy, has ber This book will bear comparison with any other textbook of psychiatry in English and is recommended without reservation to the student and practitioner of psychological medical

World Directory of Dental Schools. Geneva, World Health Organization, 1961. Pp. 228. 25s. Av. able through H.M. Stationery Office.

With the publication of this directory, the World Health Organization presents a unique we of reference on dental education throughout the world. Its users will be able to refer to the systematical designs and the systematical designs are supported by the systematical designs and the systematical designs are supported by t of dental education in any country and to seek information on the training institutions there Each country has a separate chapter in which are described the administration, curriculum are ditions of admission and examination procedures of the dental schools, with some details of the me lations governing licence to practice. Other pertinent data, such as the number of dental schools at the ratio of registered dentists to population, are tabulated at the head of the chapter. The schools are tabulated at the head of the chapter. themselves are listed in tables giving the name and address, date of foundation, number of teachers staff, total enrolment, annual admissions, number of graduates and annual tuition fees. Find an annex summarizes obligations which certain states require from their dental graduates, which another lists the basic degrees and diplomas conferred by dental teaching institutions in all the countries. Apart from one or two minor errors, for example "the degree of Licentiate in Denisurgery" in line 4 of the introduction, the section on the schools of the United Kingdom is a come and concise factual statement. D. V. TAYLO

Problems of Infection, Immunity and Allergy in Acute Radiation Sickness. N. N. KLEMPARSKY. O. G. ALEKSEYEVA, R. V. PETROV, and V. F. SOSOVA. London: Pergamon Press, 1961. Pp. 16 Illustrated. 50s.

The authors survey the pathogenesis of "radiation sickness" in so far as it is explained by the changes in the immune response of mammals exposed to a high dose of ionizing radiation. They to mainly on Russian works, although the references quoted give a good review of the relevant Wester literature. The translation is obscure and the figures and tables in the text are often inadequate explained and incorrectly labelled. The experimental methods used are described in detail; the corrections are the corrections are the corrections and incorrectly labelled. clusions drawn, however, are mostly questionable on the grounds of the small number of animused. This book is difficult to read and is useful, mainly, for the research worker who has no dire access to Russian scientific papers. J. GAT

The Principles and Practice of Medicine. 6th Edition. Edited by SIR STANLEY DAVIDSON. Edinburg and London: E. & S. Livingstone, Ltd., 1962. Pp. 1139. Illustrated. 35s.

The Editor and his contributors, who are drawn from past and present members of the Staff the Department of Medicine of the University of Edinburgh and its associated clinical units, are be congratulated upon the remarkable success of this textbook. Within ten years six editions and reprints have been published. The latest edition has been brought up to date but it is only sligh increased in size. A concise well-balanced style is maintained throughout the book, which is easy read, and it is strongly recommended to both undergraduate and postgraduate students of medica W. H. HARGREN

A Handbook for Ambulance Room Attendants. C. E. WATSON. London: Baillière, Tindall & G 1961. Pp. 128. Illustrated. 5s. 6d.

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Samson Wright's Applied Physiology. Revised by C. A. Keele and E. Neil. 10th Edition. London: Oxford University Press. Pp. 556. Illustrated. 60s.

After many postponements this new work with its attractive double column format is most welcome, less formidable than previous editions, but just as complete. In view of the considerable advances made in the past ten years entire sections have been re-written, notably those on the kidney and body fluid, the heart and circulation, and the endocrine glands. A new section on the special senses has also been introduced, and references are made to papers published as recently as 1959. Professor Samson Wright's original approach has fortunately been retained, and the presentation is logical and orderly. The illustrations are profuse, and are on the same page as the relevant text, which is most unusual. Diagrams are clear and carry short explanations which almost makes it possible to swot for an examination simply by looking at the pictures and studying the captions. My main criticism, which applies equally well to previous editions of this otherwise excellent book, is the excessive use of mathematical and statistical data. At one point the double columns are interrupted to allow an equation to ramble from one side of the page to the other. This sort of thing does not illustrate or explain, nor is it understood or remembered by the student. Another source of irritation is the use of outdated anatomical terms. I searched through three current textbooks on anatomy and could find no reference to the author's "Calamus Scriptorius." On the whole, however, I feel this is undoubtedly the best textbook on physiology available for Second M.B. or Primary Fellowship students. It is to be hoped that future editions will appear more frequently than every decade. M. BAYLISS

Lung Function Tests. An Introduction. B. H. Bass. 2nd Edition. London: H. K. Lewis & Co. Ltd., 1962. Pp. xii+84. Illustrated. 8s. 6d.

This is a splendid little book which should be studied by all practitioners of medicine. Doctor Bass has added to his first edition a short bibliography and tables of normals for some of the tests of lung function. He also gives an account of the technique for estimating the arterial p CO₂ at the bedside.

R. G. MACFARLANE

Pathology of the Nervous System. (A Student's Introduction). J. HENRY BIGGART. 3rd Edition. Edinburgh and London: E. & S. Livingstone, Ltd., 1961. Pp. 368. Illustrated. 40s.

This small volume, described as a student's introduction and based upon the author's lectures to medical undergraduates and to those preparing for the Diploma of Psychiatry, has been in print for twenty-five years and has now reached a third edition which is sufficient evidence of its continued popularity. The style is lucid, the arrangement of subject matter is excellent, and there are useful illustrations. Frequently the student is dismayed in the early study of neuropathology by unfamiliar terminology, staining technique and tissue response to disease. By drawing close parallels in general pathology, the author has succeeded in smoothing the way and at once putting the student at ease. The value of the book would be enhanced, however, if more space were devoted to explaining the pathological basis of clinical signs and symptoms and thus forging a link between neuropathology and clinical pathology. This could be accomplished without increasing the size of the book by reducing the detailed histological description of tumours and virus infections. With the present state of knowledge of viruses, a general description of the properties of viruses could be deleted and profitably replaced by a simple classification of viruses involving the nervous system. An adequate account of the various theories of the ætiology of atherosclerosis cannot be given in a few sentences and space might be conserved by referring the reader to a general review of the subject. A more dynamic and functional approach, especially in giving a more detailed discussion of cerebral blood flow in relationship to clinical syndromes, would be appreciated. The role of disturbed metabolism in the production of neurological disease might also have received more attention. In a number of instances the text has not been brought up to date. No mention is made in the pathogenesis of neurological disorders of the possible function of vitamin B 12 in ribose nucleic acid synthesis which is necessary for protein synthesis to maintain nerve cells. The danger of folic acid therapy precipitating subacute combined degeneration of the cord in the face of vitamin B 12 deficiency is not emphasized. In another chapter it is stated that there is "some relationship" between herpes zoster and chicken pox, though it is now generally accepted that the same virus is responsible for the two conditions. Coxsackie virus is not mentioned as an ætiological agent in aseptic meningitis, and some current theories of the ætiology of disseminated sclerosis have been omitted. In spite of these minor criticisms the book can be thoroughly recommended to students reading for the Third M.B. or equivalent examination, and I am confident that they will frequently refer to this book during their subsequent clinical studies. N. W. J. ENGLAND

Corrigendum: In our last number p. 97 the review of Textbook of Medical Treatment Edited by Sir Derrick Dunlop, Sir Stanley Davidson and S. Alstead. Eighth Edition, should have read, "A new section on analgesics is most helpful though the indexing slips once and makes no reference to Paracetamol."

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Vol. 108 No. 4 1962

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All papers intended for publication must be submitted in original type-written copy, double or triple spaced, on one side of good foolscap with generous margins, fully corrected. Any paper not up to these standards may be returned. Author whose material is based on Service experience are reminded of *Queen's Regulation* (1961), para. 680, and are asked to send a copy to the Editor at the same time as writing to PR 1 (a).

There is no set style, but all abbreviations must be avoided. Contributors are on the increase and, with constantly rising costs of production, their papers must be brief. Papers are accepted on the understanding that they are subject to editorial revision, including alterations to condense or clarify the text, and omission of tables or illustrations. Titles must be brief and, if possible, attractive. Lists of References must be on a separate sheet, in alphabetical order, and limited to those mentioned in the text, where they should be in the form "Makewater (1962) observes . . ." or "(Makewater 1962)." The Harvard system for bibliography is recommended and abbreviations must be according to World Medical Periodicals, 2nd Edition (1957).

The main author of each paper will receive a proof, which should be corrected and returned to the Editor swiftly. The submitted typescript is assumed to be ready for printing without further alteration. Allowance is made for reasonable corrections; unreasonable corrections may be disallowed, or charged to the author. An author who subscribes to the *Journal* may have on request up to 50 reprints free, divided between the authors of a joint paper.

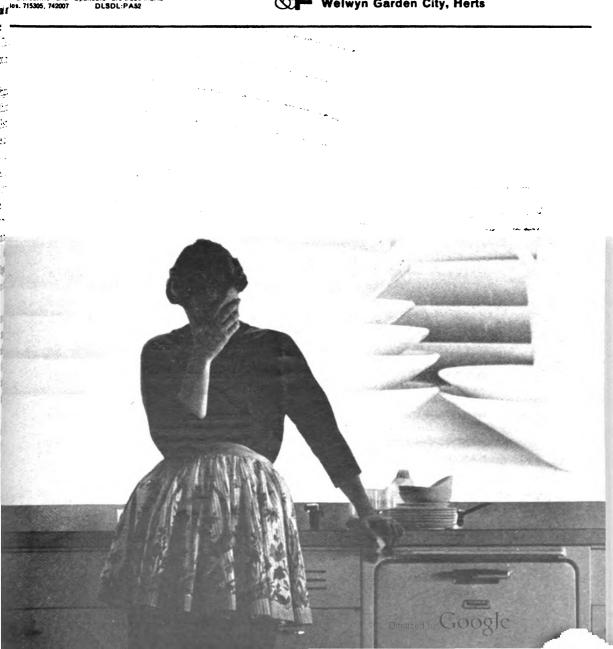
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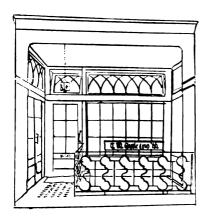
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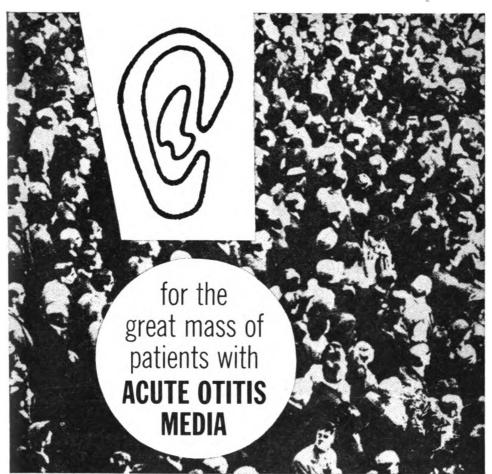
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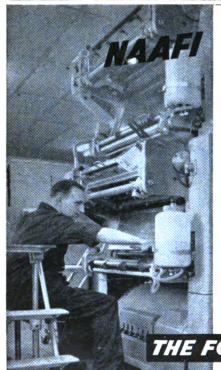
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BEFORE our last issue went to press, Captain David Sargant relinquished his appointment as Honorary Editor and, shortly afterwards, his assistant, Lance-Corporal Catterick, was released from the Army on completion of National Service; details of their successors are given above.

Captain Sargant was appointed in 1960, in succession to Colonel Sayers to whom he paid tribute in his first editorial, mentioning the high standards which had been maintained "in the true spirit of the amateur." (1961, 107, 1). However, subsequent issues of this Journal soon made it clear that Captain Sargant was anything but an amateur in this context, and that he possessed talents for journalism rarely found in members of the medical profession. In Lance-Corporal Catterick, who is now a professional journalist, he had a most able assistant, and, between them, they performed the editorial task with commendable efficiency and enterprise. That their efforts have enhanced considerably the reputation of this Journal is beyond doubt and, in addition, we are most grateful to them for handing over to us a going concern with not a single skeleton in the editorial cupboard.

There have also been changes in the composition of the Committee of Management, although the Managerial Staff remains as printed on page 1 of this volume. Full details will be given in our next issue.

MILITARY MEDICINE

LETTERS to the Editor published in this issue under the heading Training for Specialists join issue with Lieutenant-Colonel MacFarlane regarding the need for army doctors, particularly consultants, to be experienced in military matters. Manu Forti suggests that the Consultants to the Army of World War II would not agree with Lieutenant-Colonel MacFarlane, yet it is considered likely that most of those skilful and gallant gentlemen would readily admit that unfamiliarity with military matters is a serious

156 Editorial

handicap to the consultant, that previous military experience would have enabled them to discharge their professional duties all the better, and that a deep and special study of the soldier and of his environment must be demanded of all consultants on full-time regular service. Captain Bloomer suggests that there is nothing particularly subtle about the practice of medicine in the Army. Why, then, was it so necessary for Chairs of Military Chirurgery to be established at Edinburgh and at Dublin, and for the teaching from these Chairs to be perpetuated and brought up to date, first at the Army Medical School, Chatham, and, to this day, at the Royal Army Medical College, Millbank?

Both MANU FORTI and Captain Evans suggest that the new policy of employing medical officers on an "area," as opposed to a "regimental," basis limits their responsibilities to the care of the sick and injured. If this were indeed the case, and happily it is not, many unit commanders would be without medical advisers and the health of troops would suffer most seriously in consequence. In actual fact, the medical officer on "area duties" must become an expert in the art of the regimental medical officer to an extent never demanded of his predecessors whose professional work was often confined to one unit at a time. An "area" may include several different units, all with special problems and particular working environments—infantry, artillery. armoured units, signals detachments, workshops and stores—and, in addition, there may well be army children's schools and other establishments with specific medical problems of their own; the individuals commanding or otherwise in charge of all these will be in need of guidance regarding medical matters. Therefore, although employment on "area duties" will provide a most satisfactory increase in the scope of clinical work, it will also involve considerably increased responsibilities regarding advice to commanding officers and others concerning the fitness of individuals for particular duties and concerning environmental medicine.

PROGRESS IN UNITED STATES ARMY MEDICINE

an address delivered by

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The Surgeon General, United States Army
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IT is indeed a great honor and real personal privilege to find myself again in this great land and to speak from this rostrum. May I first bring you warm greetings from the United States Army Medical Service. We had the pleasure of a visit from your distinguished Director-General last spring and I am delighted to pass on to you that he left behind many, many warm friends who will not soon forget their associations with him. I consider it especially appropriate this evening to emphasize the steadily increasing requirements for strengthening the military medical services of our two countries in this era of uneasy peace, and to explore with you the medical aspects of some critical trends of our times. First, I presume that most of you have some knowledge of the United States Army Medical Service, its organization, its method of operation and its basic functions—just as we have a general knowledge of your approach to military medical problems. We endeavor to keep each other informed on these matters not only to satisfy our professional curiosity but as an effective and economical way of accelerating progress of our respective services. We like to think of our medical service in terms of five broad functional areas. I refer to them as the five pillars of military medicine. These are:

- 1. The practice of medicine, including the art of medicine and preventive medicine.
- 2. Field medicine—combat readiness.
- 3. Medical education.
- 4. Medical research.
- Medical administration.

This compartmentalization of the military medical effort helps visualize the full range of medical service activities. But, under the pressure of modern problems, these functional areas are becoming so completely inter-dependent and inter-related as to be practically inseparable. We are becoming so conscious of the totality of effort that must be applied to meet the military medical problems of the day that we hesitate to draw even a faint line between the peacetime practice of medicine and combat readiness, or speak of medical care aside from medical research and medical education. This concept of the totality of the military medical effort is another one of those fundamental truths of which we have become more increasingly conscious in modern times, and which has gained new meaning with the growing complexity of military



medicine and its problems. More than ever we are conscious of the fact that progress of our service can be achieved only by simultaneous improvements in every facet of its operation, and much of our effort is directed toward maintaining proper balance in these capabilities. I want to tell you just enough about what we are doing in some of these areas to emphasize our underlying concepts of a military medical service.

The practice of medicine in the Army includes, of course, both preventive and therapeutic medicine and involves a multiplicity of functions, activities, and resources. The concept of totality, of which I spoke before, applies equally well to this area, and is of increasing importance in the practice of modern medicine, particularly patient care.

The physician is, and always will be, the central figure in the practice of medicine The quality of patient care provided in the Army hinges primarily on the knowledge. skill and devotion of this physician. After World War II our most concerted efforts were directed to strengthening and improving the Medical Corps. We instituted residency training in seven general hospitals and strengthened our intern program which had been in existence since 1925. Board approval was obtained for all necessary specialities and with the aid of our civilian consultants I am happy and proud to report that this training through the years has been a prodigious success. Currently. 69 per cent of the officers of the regular Army Medical Corps are board certified or board qualified and another 28 per cent are in residency training. Only 3 per cent are in neither category. The internship and residency programs in our army hospitals are among the most sought after in our country. Today, we are training about 500 residents and 182 interns. The fine young physicians who are entering the Army and our excellent training programs assure us of a Medical Corps of the highest caliber, both in spirit and capability. The personnel of the other Corps of the Army Medical Service, as well as the enlisted and civilian men and women who support them, are of equally high caliber. While the individual physician can and still does play an important role in the professional medical care more and more the practice of modern medicine is becoming a team effort of professional and ancillary personnel. as well as the marriage of personnel, facilities, equipment and management.

The practice of modern medicine today more than ever before requires modern facilities with modern up-to-date equipment. World War II left us with hospitals which, by now, are outmoded, if not outworn. Nevertheless, in face of the available capacity, it was difficult to create interest in the construction of permanent, modern hospitals. However, this program is finally underway and is gaining momentum. In the last five years we have completed construction of eleven permanent, modern army hospitals in Continental United States. Three more are under construction, and two others are about to be started. We intend to continue to press this program until every American soldier, who is in need of medical care, has access to a hospital which he can enter with dignity and with assurance that all the knowledge and skill available to modern medicine will be brought to bear towards his successful and rapid recovery.

We are carrying out an equally vigorous program in modernization of equipment in our older hospitals. The technological advances of modern medicine are so rapid that we can no longer afford the traditional approach of waiting until a piece of equip-

ment is worn out before replacing it with its modern counterpart. In addition to replacing outmoded equipment, we find that we must acquire many new types of equipment essential to the practice of modern medicine. Equipment used in heart surgery is one example. We believe this to be a sound investment; anything less would be unpardonable waste of professional capability of our medical teams.

I hope you noticed that in mentioning the practice of medicine as one of the pillars, I called particular attention to the art of medicine. We believe strongly that a hospital, perhaps more than any other place, must recognize the sanctity of the individual and the dignity of man. It must take every possible step to provide comfort, establish confidence, and a generally receptive attitude on the part of the patient. This is not only good medicine, but is the right of the soldier as citizen and human being. We have expended much effort—and I may add considerable sums of money in rehabilitating and improving our outpatient services. Again, we have emphasized not only adequate facilities for examination and treatment, but also more attractive surroundings, more comfortable waiting-rooms, a better appointment system to reduce waiting to a minimum, and similar improvements catering to patient and human needs. We have given responsibility for staffing individual clinics to the corresponding professional departments assuring outpatients the same standard of care as was traditionally reserved for inpatients. Organizationally, we have raised the outpatient service to departmental level. To emphasize our changing concept of ambulatory patient care, we have eliminated the old nomenclature of "outpatient service" and "dispensary" and substituted the title, "Department of Hospital Clinics."

Combat readiness, field medicine, is a continuing responsibility of the Army and its medical service. Field medicine has the dual problem of fighting a hostile environment while counteracting the destructive power of our military opponent. Both opponent and environment are formidable, but so are our weapons. The weapons of field medicine are research, training, planning, and organization. In our efforts to achieve combat readiness, we can use to great advantage our past experience and current progress in the practice of medicine and in research. In military medicine the solution of today's problems through research materially enhances our capabilities to solve the problems of tomorrow. With this in mind I would like now to discuss with you the role of army medical research in shaping and molding our courses of action for the future. The rapidly changing concepts of weapons of modern war, the incredible scientific and technological progress, the trend of world events and the widely varying global responsibilities accepted by our nation are profoundly influencing the relations between military medicine and army operations.

In-Service Laboratories and Contract Program

The Army Medical Service research effort is a modest one in relation to the overall national effort. But our program is being expanded and accelerated to ensure that the power of medical knowledge can be counted upon as an increasingly strong keystone of the national defense. Our budget, approximately \$34 million for the fiscal year 1963, with more than \$40 million programmed for fiscal year 1964, is divided about equally for support of in-service and extramural efforts. In-service studies are

conducted in fifteen research laboratories or units scattered over the United States and the world; these are as follows:

Walter Reed Army Institute of Research, W.R.A.M.C.

Army Prosthetics Research Laboratory, W.R.A.M.C.

Army Institute of Dental Research, W.R.A.M.C.

Army Medical Unit, Fort Detrick, Maryland.

Army Research Institute of Environmental Medicine, Natick, Massachusetts.

Army Surgical Research Unit, Fort Sam Houston, Texas.

Army Medical Research and Nutrition Laboratory, Fitzsimons, Denver, Colorado.

Army Medical Research Laboratory, Fort Knox, Ky.

Army Medical Equipment Development Laboratory, Fort Totten, N.Y.

Aeromedical Research Unit, Fort Rucker, Alabama.

Army Medical Research Unit, Kuala Lumpur, Malaya.

Army Tropical Research Medical Laboratory, Puerto Rico.

Army Medical Research Unit, Europe Landstuhl, Germany.

Army Medical Research Unit, Panama.

Army Element of SEATO Medical Research Laboratory, Bangkok, Thailand.

Studies in the research laboratories are augmented by clinical investigations in our teaching hospitals and at other medical facilities in this country and abroad. A valuable supplement to this in-service effort is provided by an extramural program which includes 435 contracts or grants to approximately 200 universities and other appropriate research institutions. This program enables the Army Medical Service to obtain the support of many dedicated and eminent physicians and allied scientists throughout the country in our studies on problems of current military medical interest.

Primary Objective

Military medical research places major emphasis on studies to improve our capability for sustaining in combat the most essential and precious asset of a fighting force—the individual soldier. The importance of the individual increases with the complexity of his weapons, and because no equipment is more effective than the man who must maintain, service and operate it. There are cogent requirements for medical research which contribute to combat effectiveness by improving means for preventing or treating the diseases and injuries of troops in battlefield environments. Consider. for example, many of the most effective weapons and casualty-producing environmental factors of future conflicts; chemical and biological warfare agents; epidemics caused by exotic diseases of foreign lands; psychological warfare, ionizing radiation from nuclear weapons or fallout; sickness or decreased effectiveness due to sudden changes in altitude or temperature. What defenses can we develop against them? They do not blow up ships, bridges or tanks, nor shoot down aircraft—their devastating impact is achieved largely by causing death or decreasing the performance of individual soldiers. Against weapons or factors in these categories, competent medical service is the only, or one of the best, defenses. An objective of studies now under way is to provide the maximum possible "built-in" protection for each individual soldier before he enters an area of tactical operations. I refer to our work on: artificial



acclimatization to hot, cold or high altitude environments; the use of drugs taken orally to protect against malaria and other diseases, and to increase resistance to ionizing radiation; the use of vaccines to protect troops against disease agents; extension of soldiers physiological and psychological capability to cope with hazards; a search for drugs which will kill or repel insects when excreted in the sweat, and other compounds which can be taken by mouth, concentrate in the skin, and prevent fungus infections. Such "built-in" medical protection is a particularly important asset to small, widely-dispersed troop units, and for special forces teams operating in regions remote from the normal medical evacuation and hospital facilities with larger forces in the field.

Contributions of Military Medicine to World Peace

Medicine, like fine music or art, is truly a "universal language," understood and appreciated by people of all nations, and the military medical research programs have a superb opportunity to contribute to efforts for world peace. Our medical personnel in many of the new struggling nations have been remarkably successful in enhancing the prestige of the United States, because the benefits of good medical practice and preventive medicine measures are so readily apparent, and so personal, to the common people—"the man in the street." Medical assistance to any nation is easily understood by its citizens and offers a strong bridge to better understanding and a secure route to greater appreciation of our sincere intentions. It is a fitting mark of special dignity that the physician, more than anyone else today, appears to enjoy the confidence of men and women the world over.

Preventive Medicine Program

Strange as it may seem, our major problems are still infectious diseases. These have always been the scourge of armies both in garrison and in the field, and there is every reason to believe that they will continue to be major medical problems in The global character of politico-military problems future military operations. requires that American troops be prepared to operate on short notice in any part of the world. In many remote regions, U.S. soldiers would be exposed to indigenous diseases with demonstrated capability to cause explosive outbreaks of sickness among troops. Many of these diseases do not occur in this country and no effective vaccines or specific drugs are available. Diseases have occurred in epidemic form in recent years which were completely unknown previously—e.g. hemorrhagic fevers in the Philippines, Thailand and Singapore; another type of hemorrhagic fever in Argentina; Kyasnur Forest disease in India; and O'nyong-nyong fever and Chikungunya fever in Africa. Also, diseases once considered to be only of limited and local interest have been found to be widely distributed and far more common and important than originally suspected; for example, Russian spring-summer encephalitis is now known to occur throughout much of Europe, while closely related or identical viruses have been found in Malaya, in Argentina, in Canada, and even in the United States.

Army medical research is concentrating on multiple facets of these problems, developing global epidemiological and other health data, identifying and characterizing the causal agents, and developing new and improved methods of prophylaxis and

treatment. The use of attenuated living strains of viruses and other agents, currently used to produce protection against poliomyelitis, may be applicable in other areas and considerable progress has been made in developing viable vaccines for several diseases of military importance. There is an active program to develop improved materials and methods for medical control of insects and animals which act as carriers or reservoirs of disease agents of military importance. A promising lead has been achieved in the use of chemical sterilizing agents. Insects affected by the chemosterilant are apparently physiologically normal in other respects and are fully competitive with their untreated kin in seeking and finding mates, but no progeny results from the mating. At present, it is necessary to learn more about the basic feeding, resting. mating and flight habits of medically important insects, so as to apply the chemosterilants correctly and at the right time. We must also learn more about the modes of action of the chemosterilants, as well as to test new compounds for sterilizing activity. This technique has the potential of revolutionizing insect control and fantastic results have been achieved so far. Encouraging developments have also been noted in the field of insect repellents. Compounds are now known which when applied to nets with broad mesh will repel arthropods effectively. This permits the use of bed nets and head nets without the usual objections to the lack of ventilation. Studies are in progress on the use of compounds that can be taken orally and will kill or repel insects after excretion in the sweat.

Environmental Medicine Research Program

The demands of modern warfare, coupled with accelerated transportation capability. could expose American soldiers to relatively sudden changes in climatic conditions—heat, cold, altitude—intensifying the well-known military problems of frostbite. trench foot, heat exhaustion and altitude sickness. A major problem is the lowered performance capability of unacclimatized troops, which could seriously impede military operations during the critical initial period of decisive campaigns. We have succeeded in heat acclimatizing soldiers in chambers. This acclimatization persists for three to six weeks in cold weather but is reinforced by repeating the acclimatizing procedure for one or two days. In actual tests these soldiers, when suddenly transported to a hot climate, marched faster and longer in the heat, did more load-moving and had fewer heat casualties than their non-acclimatized counterparts. Cold acclimatization has been achieved which persisted for at least eleven months and did not interfere with heat acclimatization. Further study and field trials are planned.

Surgical Research Program

Studies on problems of combat surgery are being expanded and the number of university investigators is being increased. We are seeking improved surgical techniques to prevent and treat traumatic shock and wound infection, to accelerate wound healing, and to improve the management of burned patients. We seek more knowledge of the metabolism of trauma and of nutrition. Practical methods for prolonging the usable life of blood are also goals of the in-service and university investigations. Included here also is a continuing search for better plasma substitutes. Progress is being made in studies to develop new or improved methods for anesthesia.

Research in Neuropsychiatry and Psychophysiology

A better understanding of human behavior is one of the most important and pressing medical requirements for the Army. Under conditions of modern warfare, the danger of overwhelming psychiatric casualties will be even greater than in the past. Also the increased complexity of the modern environment—including the "battle for men's minds "-adds to the load on human thinking and emotions. The Army Medical Service requires improved means for detecting and reducing psychiatric casualties, as well as methods and techniques for assessment and reduction of stress due to combat and other military service. A multi-discipline approach at the Walter Reed Army Institute of Research has combined the techniques of neuropsychiatry, neuroendocrinology, neurophysiology, medical electronics, histology and experimental psychology in an attempt to gain a better understanding of human behavior, Electrophysiological studies of brain functions have been conducted which should lead to a better understanding of the brain. Techniques have been developed which provide for the first time the possibility of obtaining and analyzing data of forebrain function. The methods being developed can also be applied to the biological rhythms, which have been shown to play a much larger part in the control of all behavior and of growth than was thought earlier. Recent advances in psychology, pharmacology and physiology have greatly increased the possibility of control of human attitudes, thought and behavior. The discovery of "psychic energizers" has again raised the question of a possibility of drugs which will improve or at least sustain normal behavior. Recent studies suggest that it may be possible to plan rationally investigations of methods for specifically supporting certain functions. Studies are also being conducted on hormonal patterns and defense against stress, and studies are in progress of the activities of neurohumors in the brain as transmitters, inhibitors and modulators before and after control of stress. Despite the increased interest and the rapid developments in the study of behavior during the past twenty years, much fundamental research must be carried out to provide a sounder basis for applied research.

Biological Effects of Nuclear Weapons

The use of nuclear weapons will intensify and multiply the problems I have mentioned and will create additional problems. Nuclear explosions will produce a wide range of traumatic injuries and will cause psychiatric casualties and disease problems not dissimilar to those produced by conventional weapons when used in heavy concentrations. The differences lie in the number of casualties produced, their rapid accumulation, wide dispersion, and the added problems of ionizing radiation. The experience of the Army Medical Service in the handling of large numbers of casualties in World War II and Korea is partially applicable to the nuclear battlefield. The entirely new problem is that of ionizing radiation. I want to emphasize again that ionizing radiation is only *one* of the casualty producing factors in a nuclear explosion. In treatment and evacuation of patients consideration must be given to mechanical injuries and burns as well as radiation. Studies are being conducted to determine the effects of ionizing radiation on the recovery of surgical patients. It is important to determine the effects of repeated sub-lethal doses of radiation. Research is also being directed towards increasing man's tolerance to



ionizing radiation. Certain chemicals have given indication of a two-to-three-fold protection in experimental animals. To the degree that we are successful in these efforts, it would mean not only reduction of the number of these casualties of the battlefield, but an increase in the capability of units to maneuver through radiologically contaminated areas. The clinical effect of total body radiation needs to be evaluated thoroughly so that detailed physiological changes and clinical manifestations may be documented and correlated with pathological findings. Of equal importance is the relationship of whole body irradiation combined with traumatic injuries. The choice of an anesthetic and its effect upon the irradiated individual about to undergo surgery and postoperative procedures need further investigation. The relative effectiveness of various antibiotics to combat early or delayed infection also must be determined. I am certain that you share with me the importance of bringing this research to ultimate success.

Defense Against BW-CW Agents

Many physicians, civilian as well as military, have been asked at one time or another about the dangers which would result and the problems that would arise from the employment of biological agents as weapons of war against this country. The answers, no doubt, have ranged from the totally negative viewpoint that such a weapons system is an impractical figment of the military mind to the opposite extreme in which it is pictured as the ultimate in weapons with the prophecy that any nation foolish enough to use it will wipe the human race from the face of the earth. Neither of these views is correct, the answer lies somewhere between. Prior to World War II little consideration was given to the potential danger of biological weapons. In the fall of 1941 the National Academy of Sciences, after studying this problem at the request of the Secretary of War, submitted a report which contained the following statement: "The value of biological warfare will be a debatable question until it has been clearly proven or disproven by experience. The wide assumption is that any method which appears to offer advantages to a nation at war will be vigorously employed by that nation. There is but one logical course to pursue, namely, to study the possibilities of such warfare from every angle, make every preparation for reducing its effectiveness, and thereby reduce the likelihood of its use." This statement is just as true today as when written over twenty years ago. There is no assurance that biological weapons will be employed against the United States in any future war. At the same time, knowledge as to the feasability of this system makes it essential that we recognize the potential danger and prepare an adequate defense. Although foreign scientific literature contains few direct references to biological weapons research and development, there are reports indicating considerable investigative effort in areas directly applicable to offensive employment of this weapons system. Moreover, large and complex industrial facilities are unnecessary for preparation for an attack with biological agents. In appropriate circumstances a limited but effective attack could be made utilizing very simple disseminating equipment dispensing material produced in small, industrial plants easily converted to this purpose. Some individuals abhor the very thought of the use of "germs" as a method of warfare; this, however. does not degrade the requirement for planning adequate defensive measures. It is

essential that civilian physicians and allied medical personnel, as well as those in the military services, be made aware of the basic concepts of this weapons system and the means of providing a reasonable defense against it.

In these days of serious concern about the medical effects of ultrasophisticated weapons, I think you may be very much interested in some of the primitive weapons still in use in many regions of the world today. These photographs illustrate some of these weapons recently received in my office from Viet Nam used by the Viet Cong. (Lantern slides of these weapons were then shown—Ed.).

Iron Spikes in Wooden Block

Multiple, hand-wrought, pointed and barbed, iron spikes, several inches in length, are firmly set in tropical hardwood. The devices are set in footpaths or rice paddies. The spikes pierce the shoes of the victims and cause severe wounds of the feet. These wounds are often contaminated because the spikes are frequently coated with water baffalo dung.

Box Trap

A tapered box trap is designed to wound and hold the foot of victims. It is constructed of heavy hardwood planks, bound together by clinched steel spikes. The device is buried in trails and camouflaged by a covering of appropriate foliage.

Projecting straight upward from the floor is an iron spike to pierce the sole of the foot. Slanting downward from the sides are flexible, barbed, iron spikes, which permit the foot to pass through, then impinge it by encircling the ankle. Attempts to withdraw the foot cause the barbed spikes to pierce the ankle and upper surface of the foot. These spikes, too, are often coated with animal feces to contaminate wounds. A victim cannot free himself without assistance, and many hours may pass before he can be carried to a medical service facility.

Influence of Medical Research on Army Logistics

The requirement to treat and transport casualties on modern battlefields creates enormous logistical burdens. Military medical research can reduce these formidable logistical problems—and increase the effectiveness of American fighting forces in future operation. A few illustrations will depict the nature and magnitude of representative combat medical situations. For example, a 500,000 soldier force entering an oversea theater would require 35,000 fixed hospital beds, after 90 days, under conditions which existed in many regions during World War II. The logistical burden associated with care for these patients includes:

Logistical Requirements for 35,000 Fixed Hospital Beds (Standard IV Hospitals)

Approximately 85,000 short tons of construction materials.

Approximately 35 engineer construction battalions of almost 800 men each, working more than 1½ months.

Providing for almost 41,000 medical personnel, including 3,000 physicians and 4,500 nurses. Construction over area of approximately 1,500 acres. Provision of 23,000 kW. of electric power. Provision of almost 3,000,000 gallons of treated water per day.

We feel that we are making encouraging progress in reducing the effects of factors which have been historically responsible for the major contributions to the described patient load, particularly in the development of better methods to prevent or treat infectious diseases of remote strategic areas.

A review of the history of warfare invariably discloses enormous advantages that have accrued to nations best prepared to cope with medical problems of the



battlefield. In past wars more troops have been made non-effective by disease and environmental stresses than by injury from weapons. For example:

In Napoleon's march to Moscow his army dwindled from 533,000 to 95,000 although only two battles were fought. His splendid army was decimated by the effects of extreme cold, typhus fever, and other diseases.

In the Crimean War (1854-55), 7,500 French troops died of wounds, but 70,000 died of disease. In World War II (1942-45), among U.S. Army troops, 72,000,000 man-days were lost due to battle injuries, but 286,000,000 man-days were lost due to infectious diseases.

In the initial stages of the New Guinea operation in World War II, six to eight U.S. Army soldiers were evacuated because of malaria for each one soldier evacuated because of battle wounds.

Summary

The complexities of modern warfare have created many new and challenging requirements for military medicine. Our Army Medical Service is being provided with increasing resources to cope with these problems and an expanding program has been planned to increase our capability to support the United States Forces in a wide range of possible future operations. We have the satisfaction of knowing that the fruits of our military medical studies will be of value to all mankind, regardless of future military events. We seek and welcome the support and counsel of our civilian colleagues in these efforts because we believe that military and civilian medicine are not only related but inter-dependent. I am confident that the combined efforts of the United States Army Medical Service and the Royal Army Medical Service will continue to be as meaningful for the future as they have been rewarding for the past.

INVESTIGATION OF AN EPIDEMIC OF SHORT-TERM ILLNESS AMONG BRITISH TROOPS IN CYPRUS

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This article deals with a well-defined short-lived clinical syndrome which occurred in epidemic form in eastern Cyprus during the late summer and early autumn of 1959. An investigation of this pointed towards a virus origin and, since a search of the literature has failed to reveal any account of a similar virus illness in Cyprus, it is felt that a brief description of this study might be of value.

Method and Material

An attempt was made to tabulate the epidemiological and clinical features of this outbreak and a laboratory investigation was carried out. The latter included virological studies, which due to difficulties in preserving specimens during transportation to the United Kingdom were unfortunately incomplete.

One hundred and forty-five patients presenting a very similar picture were admitted to British Military Hospital, Dhekelia, during the period: 144 were male military personnel and one was a service female. The mean age of the group was 20 years.

Epidemiology

The following observations were made. Every patient came from the eastern half of Cyprus. No patient was admitted to the Reception Centre, Polemidhia, serving the western area (personal communication from Brig. K. P. Brown). 66% gave a history of recent contact with a similar type of illness. During the first two months of the period, 75% had spent less than one year in the Middle East, while in the latter two months this figure fell to 45%. The illness seemed to be confined to young British servicemen since the civilian Cypriot practitioners recognized no similar outbreaks among the local population. However, this syndrome appears to have occurred among British troops in Cyrenaica (personal communication from Dr. M. B. Bailey).

Enquiries as to recent movements, type of accommodation and sanitation, recent contact with fresh water, recent injections, insect bites and possible infestation with rodents of the patient's unit yielded equivocal or negative results.

Clinical Features

The mean length of illness was six days. The course was benign and relapses occurred in only 12% of patients. The mode of onset was acute in 77%, sub acute in 10% and gradual in 13%. The usual presenting symptoms were: headache (47%);

stuffed nose and/or coryza (10%); weakness, fatigue and shivering (10%); sore throat (8%); severe abdominal pain which in several cases mimicked that of an abdominal emergency (5%).

Malaise was a constant feature although not as prostrating as in infective hepatitis or sandfly fever. The other common symptoms are listed in Table I.

The clinical signs are set out in Table II. 79% developed pyrexia—usually within the first 48 hours—which was of mean duration 2.5 days and which in 48 patients exceeded 102°; the remaining 21%, although apyrexial, felt just as debilitated. Moderate enlargement and frequently tenderness of the lymph nodes were striking physical signs. Although widespread in 111 patients, in 15 this was confined to one group of lymph glands, either the cervical or axillary, and a characteristic feature was the involvement of the epitrochlear glands in 70 patients. Coating of the tongue was heavy and was best marked at the sides. Although injection of the fauces was seen in the majority of those with sore throat, tonsillar enlargement was infrequent and membrane or ulceration never found.

Neck stiffness was associated with a high temperature and a severe clinical course, as well as pain on moving the eyes, nausea, vomiting and, in 17% of the patients, with subjective complaints of drowsiness: Kernig's sign was elicited in a minority only, while objective evidence of clouding of consciousness was never found.

Abdominal tenderness and guarding were commonly iliac or epigastric and persisted in one patient only for more than 48 hours: he proved to have a pelvic abscess. Complaints of frequency and pain on micturition were unassociated with objective evidence of genito-urinary disease.

Auscultatory chest signs (17%) and pleuritic pain were seldom associated with radiological evidence of a lung lesion.

Investigations

Every patient, on admission, had a chest X-ray and a urine examination for albumin, sugar, and frequently bile. 63% had a white cell count; 22% a Paul Bunnell: 16% an E.S.R; 13% a lumbar puncture. This last investigation was only done in those with well-marked meningism: ethical considerations limited its use in such a benign illness. Virological studies were carried out in 74%. Initially Widals, Brucella agglutinations and thick blood films for treponema recurrentis were done in a few patients without positive results.

Cerebro-Spinal Fluid (C.S.F.). Thirteen patients had an abnormal C.S.F.; 12 had a pleocytosis ranging from 6 to 800 cells (7 between 10 and 100), and a C.S.F. protein exceeding 45 mgm. % (48-220 mgm. %); one had an increased C.S.F. protein alone. In every case lymphocytes predominated, although three patients had a considerable proportion (20-50%) of polymorphs. In general the protein varied as the cell count. No abnormality in chloride or sugar content was found. Microscopy and culture revealed a sterile fluid.

White Blood Count. Eighteen patients showed a leucocytosis (11.000-20.000), four of whom had meningitis: no abnormal white cells were seen. A relative lymphocytosis occurred in 25 patients.

E.S.R. This was elevated in 17 patients.



TABLE I
FREQUENCY OF PRINCIPAL SYMPTOMS DURING ILLNESS

Symptom	% of series	
Headache	97	
Anorexia	85	
Stuffed or blocked nose and/or coryza	75	
Muscular aches and pains	64	
Nausea and vomiting	63	
Sore throat	60	
Dizziness	60	
Cough	57	
Abdominal pain	50	
Complaints of drowsiness, dreaminess, disorientation	17	
Paraesthesiae of limbs and trunk	13	
Sore eyes and pain in the eyes	12	
Photophobia	12	
Chest pain, retrosternal ache and/or pleuritic	9	
Dysuria and frequency	2	

TABLE II
FREQUENCY OF PRINCIPAL CLINICAL SIGNS DURING ILLNESS

Sign	% of series
Pyrexia	79
Lymphadenopathy	87
Coated tongue	99
Injection of fauces	74
Neck stiffness	37
Positive Kernig's sign	6
Suffusion of conjunctivae	30
Abdominal tenderness	29
Auscultatory signs in chest:	
Sonorous rhonchi	15
Crepitations	2

TABLE IIIa
RISES IN TITRE DIAGNOSTIC OF INFECTION WITH L.C.M.

Case No.	1st specimen titre	2nd specimen titre	3rd specimen titre
1 2 3 4 5	· · · · · · · · · · · · · · · · · · ·		

TABLE IIIb
RISES IN TITRE SUGGESTIVE OF INFECTION WITH L.C.M.

Case No.	1st specimen titre	2nd specimen titre	3rd specimen titre
6 7 8 9 10 11 12 13 14 15	A.C. A.C. A.C. A.C. A.C.	A.C. 4 - 2 - 2 - 2 - 2 - 2 - 2 - 2 - 2 - 2 -	V.C. A

A.C. = anticomplementary

Chest X-Rays. Seven patients showed shadows: in all but one these were ill-defined and irregular, while the remaining man (in whom a serological diagnosis of Q fever was later made) had a well-defined homogenous opacity. In only four were abnormal auscultatory signs found. The incidence and appearance of these radiological changes suggested aspiration from the upper respiratory tract.

Paul Bunnell. None was positive.

Virology. Studies were conducted at the Royal Army Medical College virus laboratory, Millbank. Paired sera with an interval of three weeks were taken from 108 patients. the first sample being obtained within three days of admission and a third, six weeks later, if the earlier samples of blood had yielded positive results. Attempts at virus isolation from blood and stool were unsuccessful. Difficulties in preserving specimens precluded any attempt at transporting pharyngeal washings. The results of the serological investigation are shown in Table III. Five patients had a fourfold, or greater rise in titre of antibodies to lymphocytic choriomeningitis (L.C.M.) and 11 showed L.C.M. antibody in one or more specimens of serum without a diagnostic rise. Two of these patients exhibited mild meningism while a third had frank meningitis. One patient showed a diagnostic rise in titre to Q fever antigen. No serum showed any response to the following antigens: influenza A, B, or C; adenovirus; mumps; sendai;

M.G. streptococcal agglutination. Virus neutralization tests were also done in the 16 L.C.M.-positive patients; the results were in every instance equivocal.

Control Series. Specimens of clotted blood were taken from three control groups during the period of the epidemic: 35 male British other ranks with other short-term pyrexial illnesses admitted to the hospital (paired sera): 28 male British other ranks admitted to the hospital for surgical conditions (one specimen each); 30 native Cypriots in the wards of the Nicosia General Hospital (one specimen each). None of these sera showed antibodies to L.C.M.

Local Fauna. A number of specimens of clotted blood from dogs, sheep and goats in the island were obtained: none of these showed serological evidence of L.C.M. infection. Neither was L.C.M. isolated from ten mice caught in army camps in various parts of the island.

Discussion

The cardinal features of this outbreak were upper respiratory and gastro-intestinal symptoms, muscle pain, meningism and lymphadenopathy. A benign illness of such diverse manifestations suggested a wide differential diagnosis. The local euphemism, "Cyprus flu," implied a resemblance to influenza which was not substantiated by the serological results.

Of greater practical importance was its differentiation from anterior poliomyelitis. This was made by the absence of muscle tenderness, paralysis, sleeplessness and typical anxious affect. Meningism and lymphadenopathy occur in Echo and Coxsackie infections (Jamieson 1959) and were features of the Royal Free Hospital epidemic (Medical Staff of the Royal Free Hospital 1957): the rash of the first was not seen, enterovirus was not isolated from the stools and the last was eliminated by the absence of C.N.S. involvement, muscle tenderness and protracted sequelæ.

A superficial resemblance to glandular fever was disposed of by the short clinical course and negative Paul Bunnell examinations. Although muscle pains and suffusion of the conjunctiva suggested leptospirosis the low incidence of leucocytosis and absence of proteinuria or jaundice made this unlikely and this illness has not been described in Cyprus. Undulant fever and relapsing fever are seen in the Mediterranean area, but these possibilities were outruled by the appropriate investigations.

Several similar epidemics of a short-lived summer illness have been described, notably the Greenland outbreak (Dein 1954) of unknown aetiology, and an epidemic among American troops in the Philippines shown by virus neutralization tests to be due to encephalomyocarditis virus (Smadel and Warren 1947)—a possibility not explored in this investigation.

Although bedevilled by a paucity of positive results, the serological screening suggested that L.C.M. might be incriminated as an aetiological factor. Although the small number of lumbar punctures performed preclude dogmatic statements, the high incidence of meningism suggests that the illness could tentatively be put in the acute aseptic meningitis group (Wallgren 1925), a finding which would support the L.C.M. hypothesis. That L.C.M. can cause a mild systemic illness is well documented (Cecil and Loeb 1959, Adair, Gould and Smadel 1953, Gard 1954, Miles 1954, Goldfield 1957) and a high incidence of neutralizing antibodies to this virus in a large random sample of the U.S. population has been reported (Goldfield 1957). On the other hand



the proportion of positive complement fixation tests (C.F.T.) to L.C.M. in the present series is disappointingly small. However, it has been suggested that virus neutralization tests are a more certain way of detecting L.C.M. antibody, and that only 70°, of infections so diagnosed give a positive C.F.T. (Adair, Gould and Smadel 1953). Unfortunately, there is no fully documented account of an epidemic of L.C.M. systemic illness in the literature.

No history of contact with mice and other rodents was constantly elicited here, nor did a virological investigation of a number of local animals reveal past or present infection with L.C.M. Only one rodent, indigenous to the island, was unobtainable for such studies. This was the carob rat which nests in carob trees. In the light of the seasonal occurrence of this epidemic the migrations of this animal at carob harvest time and its possible role as a reservoir of infection require investigation.

Although an association between antibodies to L.C.M. and the syndrome here described has been clearly shown, in the absence of virus isolation, no causal relationship can be postulated. Three other observations remain inexplicable: the high incidence among young British soldiers, the occurrence of L.C.M. positive sera in the first half of the epidemic and the concentration of all cases in the eastern half of Cyprus.

Summary

The clinical features of a short-term illness epidemic in Cyprus in the late summer and autumn of 1959 are described. These form a consistent syndrome. On examination by C.F.T. of paired sera 4.6% of patients showed rises in titre diagnostic of L.C.M. infection, while 10.2% gave a positive result for L.C.M. antibodies in one or more specimens. Three control series gave negative results to C.F.T. for L.C.M. Virus neutralization tests for L.C.M. were inconclusive and no virus was cultured from blood or stools. It is felt that an association, but not a causal relationship, between L.C.M. and the clinical syndrome has been established. No link-up between the infection in man and the fauna of the island was established. The possible role of the carob rat is discussed.

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CASUALTY HANDLING EXERCISE

1 (BR) CORPS

Being the experiences of an Old Millhand

Lieutenant-Colonel R. J. GRAY

Introduction

THE nickname "MILLHAND" is peculiar to 1st British Corps and was first introduced to a wider audience at the D.G.A.M.S. Study Period in October, 1961. The name MILLHAND was coined in 1960 with all that concentration of thought which the British, and Irish, devote to such projects, and to the initiated it signifies the handling of 1,000 casualties. Its aim was primarily to practise field medical units (field ambulance and field dressing stations) in the handling of a large number of casualties such as might arise from nuclear incidents.

In the two years which have elapsed since its inception, this form of training exercise has been divided by circumstances into two phases. As the second phase has been named MILLHAND BRAVO it will be less confusing if, for the purpose of this article, the first phase is posthumously referred to as MILLHAND ALPHA.

MILLHAND ALPHA was practised from June, 1960, to August, 1961, before the cessation of the National Service call-up had begun to have serious effects on the medical manpower position. Field medical units were at full strength and it was thus possible to carry out this and any other exercise on the grand scale. In those days 1,000 casualties really were handled, usually over a 16-hour period, and Old Millhands will remember with nostalgia—or nausea as applicable—those long weary hours spent in cellar or gymnasium occasionally relieved by the welcome hospitality of a neighbouring regimental mess or distracted by tea induced dyspepsia. With sufficient manpower available it was possible to test fully not only the skills of the participants but also the adequacy and relevance of the equipment (A.F. G1098 and I1248), and to make the necessary representations where this was found wanting. It became obvious that no new scale of equipment for field medical units should be promulgated until it had passed a MILLHAND-type test. The advantage of such a method over the orthodox method of scattering one's bread upon the waters (by posting copies of draft scales to all commanding officers for comment) should be self-evident.

Before giving an outline of the mechanics of a MILLHAND exercise it is again stressed that MILLHAND ALPHA and MILLHAND BRAVO differed only on the scale of the exercise. Whilst in the earlier ALPHA series it was possible to field a boosted advanced dressing station, in the later BRAVO series the modified advanced dressing station was manned by less personnel. It is of particular interest to note that of these 30 other ranks only 12 to 15 were in fact R.A.M.C., whilst the remainder were first-aid trained drivers of the Mixed Services Organization (displaced persons employed by the B.A.O.R. and speaking little English).

Millhand Mechanics

In both phases of MILLHAND the approach was very similar and was in essence as follows:

- 1. Organization. One field ambulance (or field dressing station) provided the players, whilst a second field ambulance provided the control staff. The players were responsible for setting up the advanced dressing station, treating, holding and evacuating the casualties. The controllers carried out the initial field medical documentation, applied token dressings, inserted Type "B" radiac sources and dispatched the casualties to the advanced dressing station. They also simulated a rearward medical unit and received the evacuated casualties back again in time for the next round. The controllers were themselves controlled by two written briefs known as "pinks," one detailing the rate of flow and the other listing the casualty diagnoses and essential data (percentage burns, degree of radiation, etc). The latter "pink," originally drafted by the B.A.O.R. consultants, usually contained some 40 per cent of Priority I cases.
- 2. Accommodation. All but one of the MILLHAND exercises have taken place inside buildings such as cellars, canteens, garages or in fact any reasonably large building with a convenient circuit. This, of course, is what one would aim to do in war preserving one's tentage for its more appropriate role at garden parties and cricket matches. The method was for the players to take over one set of buildings for their advanced dressing station, whilst the controllers established themselves in any building in the vicinity where floor space allowed the out-going and in-coming mock casualties to be laid out.
- 3. Mock Casualties. The mock casualties were naturally the most important ingredient in the exercise. In the ALPHA series it was usual to borrow 500 men from the regiments of the brigade concerned on the basis that such men, well fortified with casualty rations at regular intervals, would only be called upon to make two appearances. In the smaller scale BRAVO exercises (300 to 500 casualties in 5 to 8 hours) only 100 mock casualties were called for.
- 4. Umpires. In the ALPHA series the exercises were heavily umpired so that close checks could be kept on the various points under test including the theoretical use of expendable equipment, the adequacy of non-expendable equipment, documentation difficulties, causes of bottle-necks and manpower fatigue. The essential task of an umpire, however, was to simulate realism by ensuring that treatment was faithfully applied, as in the application of Thomas splints, or by imposing time delays on the medical staff for the various procedures with which it would be injudicious to inflict mock casualties. An example of these time delays is given in Table 1. Thus once the trials aim of the ALPHA series had been achieved it was possible to employ less senior personnel as umpires, e.g. the quartermaster staff of the player unit.
- 5. Exercise Play. As already indicated the length of the exercise was determined by the number of people taking part, ranging from 16 hours for 1,000 casualties in the original ALPHA phase to a minimum of 4 or 5 hours for 300 casualties in the current BRAVO phase. In the ALPHA exercise it was customary to vary the rate of flow considerably, alternating periods of intense activity with periods of relative

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TABLE I
SPECIMEN TIME DELAYS IMPOSED BY UMPIRES

necessary		ng-dow	'n on	veins	is de	emed 	10 mins.
THOMAS Splint cases; for traction with elastic adhesi				i meth	od to	skin 	10 mins.
PLASTER of Paris techniques:	:						
Simple slab (unless actually	y made)	******					5 mins.
TOBRUK Splint	*****						15 mins.
SPICA, etc.					******	*****	15 mins.
EMERGENCY operative proce	edures e.	g.:					
Completion of traumatic a	mputatio	on	*****				15 mins.
Securing bleeding points	******	*****			****		20 mins.
Tracheostomy		*****				•	10 mins.
Maxillo-facial procedures	*****	*****	*****				30 mins.

inactivity. It was these slack periods which proved most trying both to the players and their dyspeptic umpires. However, in the BRAVO series the process inevitably changed to a short build-up, while the control staff got into their stride, followed by several hours of intense activity. This process proved very much more popular with the players (and umpires) though on occasion it drove the controllers slightly manic. In all the exercises it was customary to cease evacuation back to control 1 to 3 hours before the end of play in order to practice the advanced dressing station in holding the maximum number of casualties.

Lessons Learned

The more important lessons learnt in this series of exercises may be summarized under the following four headings:

1. Procedure and Organization. Much that had been forgotten was re-learnt. The sorting of casualties had to be coarse and swift, and had to be commenced inside the casualty vehicle. Bottle-necks, especially those caused by documentation and de-contamination, had to be ruthlessly exorcized. A fairly standard advanced dressing station lay-out, despite the intense individualism of field

TABLE 2
OUTLINE ORGANIZATION OF AN ADVANCED DRESSING STATION

Area	Sub-divisions	Essential Staff	Additional Detail		
AMBULANCE HALT		Senior N.C.O. (Initial casualty sorter) Stretcher Bearers (S.B.s)	Radiac monitor		
RECEPTION (3,000 f.s.)	Stretcher Walking	Medical Officer (M.O.) Non-Medical Officer (N.M.O.) Stretcher Bearers	Includes peripatetic docu- mentation clerks, inoculation team and decontaminator.		
TREATMENT (3,000 f.s.)	Major Resuscitation Minor	Medical Officers Nursing Orderlies Medical Officer Non-Medical Officer Nursing Orderlies	Includes emergency surgery.		
EVACUATION (2,000 f.s.)		Warrant Officer or N.C.O. Stretcher Bearers	Includes treatment team, re- freshment counter, stretcher and blanket dump.		
EXPECTANT (1,000 f.s.)		Padre Junior N.C.O.	Positioned in a secluded area for casualties formerly de- scribed as "transport risks."		
EXHAUSTION (1,000 f.s.)		Junior N.C.O.	Suitably positioned so that the occupants cannot infiltrate into the Evacuation Area.		

Notes (a) Areas indicated in first column are optimal.

(b) Medical officers indicated for "major treatment" would normally include the unit dental officer performing maxillo-facial first aid, tracheostomies and administering anæsthetics.

ambulance commanders, was achieved. An outline of this organization is indicated in Table 2.

- 2. Equipment. A really significant proportion of disposable equipment is essential. Also, it was of interest to note the speed with which pressure of circumstances converted the most conservative of medical officers, the writer included, to the use of oral electrolytes.
- 3. Documentation. This is delicate ground to tread upon, but as our D.D.M.S. has already referred to the "tyranny of A.F. W3210 and 27A,"one is emboldened to tilt a lance at the Field Medical Card, F Med 26. Although considerably revised and including a "mannikin" (quaintly described as a "mannequin" in an official missive) it is still not in the form which allows all the other associated bits of paper to be dispensed with.

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4. The Stretcher-bearer. This most long-suffering of men has seen little change in his lot since stretchers were invented. However, now that he has become so scarce there is increasing awareness that any failure in this particular link is bound to prejudice the medical effort. Two experimental light-weight tubular metal stretcher-carriers for advanced dressing station use have already been produced in 4th Division and development continues.

Comment

This article has described in outline a type of exercise which, although only one approach to this particular training problem, has proved of value in giving medical personnel a good grounding in the handling of large numbers of casualties. If the stimulation of swarms of bees in hitherto quiescent bonnets can be regarded as a measure of success then this exercise has proved its usefulness.

APPOINTMENT OF HONORARY CONSULTANTS TO THE ARMY

Pædiatric Surgery

Mr. D. J. WATERSTON, M.B.E., M.B., F.R.C.S., has been appointed Honorary Consultant Pædiatric Surgeon to the Army with effect from 15th July, 1962.

Orthopædic Surgery

Professor D. R. GUNN, M.Ch., F.R.C.S., has been appointed Honorary Consultant Orthopædic Surgeon to the Army in Singapore with effect from 25th September, 1962.

DYSPEPSIA IN THE ARMY

الروارة والأراج

Brigadier A. P. TRIMBLE C.B.E., M.D., F.R.C.P.(Edin.)

Consulting Physician, British Army of the Rhine

Introduction

This is a report of an investigation of dyspepsia carried out in B.A.O.R. during the twelve months—August, 1959, to July, 1960. The objects were to assess the frequency and importance of dyspepsia, particularly in the young soldier, the extent to which this is a burden on the medical services, whether the common vague occasional dyspepsia in the young soldier was of gloomy significance, and to investigate the natural history of peptic ulcerations with special reference to medical categorization.

Material Studied

Only the male population was investigated. At the time in question the male strength of B.A.O.R. was 55,329.

TABLE A

 Age Distribution of Population Studied

 up to 30 years
 —
 44,518 (80 per cent)

 31-40 years
 —
 7,558 (14 per cent)

 over 40 years
 —
 3,253 (6 per cent)

 up to 25 years
 —
 41,340 (75 per cent)

 over 25 years
 —
 13,989 (25 per cent)

Sixty-three per cent were regular soldiers and 37 per cent were National Servicemen.

Definition of Terms Used

Throughout, the phrase "organic dyspepsia" is used to describe those cases where an organic lesion either was demonstrated radiologically or assumed confidently by, for example, the occurrence of bleeding.

"Dyspepsia" is used synonymously with the lay term "indigestion" for which no organic cause was found.

Method of Investigation

The prevalence of organic dyspepsia over the year was ascertained as follows:

- 1. Hospitals notified each case as it occurred.
- 2. The medical records (F. Med 4.) of every officer and other rank in the Command were scrutinized by unit medical officers twice during the period and any case still downgraded on account of organic dyspepsia notified.

The medical officers concerned completed a proforma for each case giving a brief outline of the condition, and particularly with regard to the age at first onset of dyspepsia of any type. It was emphasized that this did not refer to the onset of regular dyspepsia.

In addition, 783 officers and other ranks under the age of 26 were interviewed by the writer and questioned on dyspepsia occurring in themselves and in their immediate families. One hundred and ten of these were from base installations. The remainder were from five fighting units. Seventy per cent were regular soldiers and 30 per cent were National Servicemen, figures which roughly correlate with the overall figures for the Command.

Findings

Dyspepsia. This was found to be remarkably common in otherwise fit, young men.

TABLE B

Occurrence of Occasional Dyspepsia

- 30 per cent admitted to occasional dyspepsia.
- 7 per cent reported sick at some time with dyspepsia.
- 2 per cent were referred to hospital.
- 27 per cent gave a family history of dyspepsia.
- 47 per cent of occasional dyspeptics gave a family history of dyspepsia.
- 20 per cent of those with no dyspepsia gave a family history of dyspepsia.

It is therefore seen that although the complaint is a common one, it does not represent a great burden on the medical services. These figures correlate closely with those in the Special Report to the Medical Research Council (Avery Jones et al. 1951).

Organic Dyspepsia. There were 302 known cases of organic dyspepsia in the Command, of which 165 were diagnosed during the year.

TABLE C

THEEL C					
Diagnosis in 302 cases of Organic	Dyspepsi	a			
Duodenal Ulcer		244			
Gastric Ulcer		32			
Duodenal and Gastric Ulcer		5			
Clinical Ulceration (X-ray negative)					
Hæmatemesis and Malæna (X-ray negative)					
Hiatus Hernia		1			
Thoracic Stomach		1			
	Total	302			
Ratio of Duodenal to Gastric Ulcer	==	7.6:1			

This gives an overall prevalence for the year in question of 5 per thousand. The incidence up to the age of 30 was 3.5 per thousand; for the decade 31-40 it was 10 per thousand. The 165 cases diagnosed during the year gives an incidence of 3 per thousand. This corresponds closely with the annual expectation of peptic ulcer of 3.2 per thousand given by Avery Jones and Gummer (1960). Seventy-eight per cent of all cases were regular soldiers compared with 63 per cent of strength. This slightly increased rate in regular soldiers is accounted for by the higher incidence in the age group over 30, all of whom were regulars.

Clinical Aspects

In this series, of the radiologically proved peptic ulcer cases, 10 per cent gave a history of some sort of indigestion of under two months and 30 per cent under one year. An attempt was made to assess the prognostic significance of the common early vague indigestion complained of by young soldiers. Of 127 cases first diagnosed at the age of 30 or above, only 17 per cent gave a history of occasional dyspepsia before the age of 26. This compares with an incidence of 30 per cent in healthy men.

middle age and 250 in late

middle age

Limitations of memory presumably account for the difference, but at any rate occasional non-regular dyspepsia would not appear to be of evil omen.

The complication rate in proved peptic ulcer was high, a point made by O'Brien (1961).

TABLE D

Bleeding and Pe	rforation in 276 ca	ises
Duodenal Ulcer (244 cases)	Bleeding Perforation	34-14 per cent 29-11 per cent
	Total	63-25 per cent
Gastric Ulcer (32 cases)	Bleeding Perforation	6-19 per cent 10-31 per cent
	Total	16-50 per cent
	Total for series	79-29 per cent

A notable feature was the high proportion apparently presenting for the first time at hospital as an emergency for bleeding or perforation. In 35 of these (44 per cent) the history was a matter of months, and in five cases (6 per cent) previous symptoms were categorically denied.

Natural History

Military and Civilian Prevalence Compared. The civilian prevalence was quite unknown until the work of Doll, Avery Jones and Buckatzch (1951) and Watkinson (1960).

TABLE E

Necro	psy and Clinical Prevalence (per thous	sand)
Necropsy	B.A.O.R.	
(Watkinson)	(Doll et al.)	
Rising from 5 in the early	Rising from 27 to 70 and	Rising from 3.5 to 10 and
twenties to 100 in early	100 at comparable age	to 20 at comparable age

groups

These figures are truly remarkable and show a prevalence rising to 1 in 4 post-mortem besides revealing the fact that even with the most expert investigation only one half are clinically diagnosable. The Army figures are remarkably low, and it may well be that the diagnostic expertise was lower than that of Doll et al., but it cannot have been markedly so since the annual diagnostic rate was almost the same in the two surveys (3 and 3.2). National Servicemen were of course invalided out of the Army, but the low prevalence in the older age groups (all regulars) suggests that a higher proportion downgraded for peptic ulcer leave the Army early, voluntarily or involuntarily. The annual diagnostic rate of 3 per thousand means that the careers of approximately 450 servicemen are thus affected each year.

Prognosis. The true prognosis is intimately bound up in the facts of prevalence. A perforation and bleeding rate of almost 1 in 3 is at first most alarming but on reflection is, in point of fact, unlikely to be true. If it were, according to the figures of Doll, Avery Jones and Buckatzch, 3 per cent of the general population would have bled or perforated by the age of 55, and according to Watkinson's post-mortem figures, over 8 per cent. We know this is not so. The likely explanation is that the

groups

figures are loaded with the acute case presenting as an emergency, and this is borne out by the finding that 50 per cent of such cases in this survey had a history of either a few months or actually none at all.

There is much contradictory literature on the subject, but for guidance it would seem reasonable to turn to two internationally recognized gastro-enterologists, Bockus of Philadelphia and Avery Jones of London. Bockus (1955) in his private practice estimates the complication rate at 10 per cent, including in this bleeding, free perforation, closed perforation (i.e. penetrating ulcers), gastric retention due to scarring and gastric stasis (i.e. gastric retention amenable to medical treatment). But he admits these figures too are "loaded," since what brought the patient to him was often the very occurrence of the complication or the intractability of the ulcer. He also emphasizes (Bockus 1957) that the concept of every peptic ulcer being serious is wrong and that "many people with nasal allergy each year are much more miserable than the patient who has a duodenal ulcer attack each year, easily controlled by a couple of days strict dieting," adding that prognosis greatly depends on the expertise of treatment. But he warns that if a patient bleeds once he is likely to bleed again. We in the Army would here add that the long-term prognosis is also bound up intimately with the man's attitude to his disease and to the Service.

Avery Jones and Gummer (1960) divide peptic ulcer into three categories:

Type I (25 per cent). An acute episode which does not recur. Such cases may bleed or perforate.

Type II (50 per cent). Minor recurring symptoms over many years. Easily controlled by simple measures.

Type III (25 per cent). Recurrent disabling symptoms which should have surgical treatment.

Finally, mortality of peptic ulcer. This is almost absent in the young, low in middle age, and not high in the older age groups (Bockus 1955). Avery Jones and King (1953) reported no deaths under the age of 65 in a consecutive series of 1,223 cases of hæmorrhage admitted to the Central Middlesex Hospital.

The Medical Grading of Cases of Peptic Ulcer

The natural history and prognosis of peptic ulcer have been reviewed in some detail because without such a review rational medical grading is not possible. It is worth repeating that in the Army one of the most important factors is the attitude of the patient himself. In general it can be said from this review that, although reasonable caution is prudent, widespread downgrading to a Home Only category, often for a period of years, is rarely if ever justified. These patients can serve just as safely and efficiently in a base area abroad as at home, and there is no reason why an appreciable number could not be graded Forward Everywhere after one year.

The Burden on the Medical Services

This is often thought to be great, but it is not so. In this survey it was revealed that only 2 per cent of young men under 26 years of age report sick with dyspepsia, and the global admission rate of peptic ulcer in the Army in 1960 was only 3.6 per thousand (Health of the Army, 1960). Peptic ulcer cases stay rather a long time in

hospital, averaging almost 40 days, and this, among other factors especially the psychiatric aspects, tends to exaggerate the incidence in our minds.

Summary

- 1. The results of a survey of dyspepsia in B.A.O.R. in the year 1959-60 are reported.
- 2. Their correlation with and divergence from a civilian survey of the Medical Research Council are discussed.
- 3. The alarmingly high complication rates reported in the Army of gastric and duodenal ulcer are examined in the context of the natural history of the disease and are thought to be false.
- 4. It is suggested that the routine medical category after the initial diagnosis of peptic ulcer be P3 (Base Everywhere) instead of, as at present, P7 (Home Only).

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A NOTE ON THE GENETIC ASPECT

A family tendency to dyspepsia is evident in Table B above, although the total family incidence is much the same as in the soldier. It has been observed for many years that peptic ulcers tend to run in families, but it is not alleged that the disease itself is inherited, there being merely a here-ditable tendency to develop it.

It is probably the result of a combination of several genes, i.e. it is polygenic or multifactorial. The separate genes for temparament, body build and the ability to secrete acid from the stomach are obvious ones. Duodenal ulcer is almost unknown in achlorhydric subjects. It is also known (Clarke et al. 1956) that individuals of the "O" blood group are more prone to develop peptic ulcer and that this is particularly marked for duodenal ulcer in the "O" group non-secretors. (Secretors are individuals who secrete their blood group antigen in the saliva. "O" group secretors secrete H substance. About 23 per cent of Western Europeans are non-secretors). Gastric Ulcer on the other hand has no similar association with non-secretion, and the independant inheritances of gastric ulcer and duodenal ulcer were deduced previously from other data by Doll and Kellock (1951).

In a very few centres these facts are sometimes put to practical use because the "O" group non-secretors have also a greater tendency to develop post-operative stomal ulcers. This may sway the decision when there is doubt as to the advisability of certain surgical procedures.

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THE QUEEN'S CORONER

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The office of coroner is one of the oldest known to the common law of England. Coroners existed as early as the twelfth century and were then, as now, royal officers. The name coroner is derived from the title custos placitorum coronæ—the guardian of the pleas of the Crown. As one of the King's Officers, the primary function of the coroner was to guard what may be called chance revenues falling to the Crown by seizing such things as the forfeited goods of felons and outlaws, royal fish, wrecks of the sea, deodands, and treasure trove. At the same time he had a duty to hold inquiries into deaths from violence and deaths in prison. These inquiries were conducted by the coroner with a jury, and the legal process was known as the "Inquisitio," a name that survives to this day in the inquest. With the passing of time certain powers and duties of the coroner were abolished by statute, and the holding of inquests on violent and unnatural deaths and deaths from unknown causes became his chief duty. The obligation to hold inquests upon treasure trove alone remains as evidence of the coroner's ancient office of revenue collector.

In early times coroners were knights on the basis of land ownership. The Statute of Westminster the First, passed in 1275, provided that "None but lawful, most wise and discreet knights should be chosen." Variations of these requirements were made at later dates until " any fit person holding land in fee " could be elected to the office. It was not until the passing of the Coroners (Amendment) Act in 1926 that a coroner was required to be either a barrister or solicitor, or a legally qualified medical man of not less than five years standing in his profession. Argument still exists as to which is the more suitable qualification—that of medicine or law. The London County Council for many years required its coroners to possess both these qualifications, and the Council of the British Medical Association in its report on the working of the Coroners Acts (1949) recommends that coroners should be medical men with a legal qualification. Formerly coroners were elected, they are now appointed and paid a salary by the council of the county or borough in which the jurisdiction lies. Most of the appointments are for life, but some whole-time coroners have a fixed retiring age. A coroner must appoint a deputy and may appoint an assistant deputy to act for him during his absence for any reasonable cause.

The office of coroner exists in England, Wales, Northern Ireland, the Irish Republic, the Dominions and the Colonies—but not in Scotland where the comparable duties are performed by a lawyer, the Procurator-fiscal. At the present time there are about 250 coroners in England and Wales, nearly all are solicitors who hold a part-time appointment combining the office of coroner with a law practice. Only a few part-time coroners are doctors. Of the eighteen whole-time coroners ten possesse the dual qualifications of medicine and law.

The duties of a coroner are laid down by the Coroners (Amendment) Act of 1926. In broad terms the Act provides that when a coroner is informed that a dead body of a person is lying within his jurisdiction and he has reasonable cause to suspect that such a person has come to a violent or unnatural death or has died a sudden death from unknown causes, or has died in prison, he will hold an inquest as to how. when, and where the deceased came by his (or her) death.

Not every death reported to the coroner is the subject of an inquest. An important discretionary power was given to the coroner by Section 21 of the Act of 1926 which provides that he can dispense with an inquest in cases of sudden (i.e. unexpected) death from unknown causes, if a post-mortem examination directed by him discloses the death to be natural, and he is satisfied that an inquest is unnecessary. Further, in a few cases where the cause of death is known, the coroner after due inquiry, may accept the death certificate of the doctor in attendance on the deceased without a post-mortem examination or an inquest. These "no inquest" cases may account for three-quarters of the deaths dealt with by the coroner.

A coroner acts upon information, he cannot initiate an inquiry; once a death has been reported it is his duty to investigate it. Apart from governors of prisons, and persons having charge of mental patients, who have a statutory duty to report deaths, the coroner is informed by relatives of the deceased, the police, and doctors, and failing these by the registrar of deaths. A large proportion of deaths reported comes from medical sources, and the procedure for informing the coroner varies. The common practice is for the doctor to telephone the coroner's officer and give details of the death he wishes to report. The question as to whether there is an enforceable common law duty to report deaths to the coroner has never been tested by judicial decision, but the *custom* whereby a doctor informs the coroner of facts which will put him on inquiry is well established and works well in practice.

Among the coroner's other duties are the authorization of the removal of bodies out of England and Wales, acting on occasion in place of the Sheriff, and the holding of inquests on treasure trove. Objects of gold or silver which have been hidden in the soil or in buildings, and of which the original owner cannot be traced, are treasure trove, and by law the property of the Crown.

When treasure is found it is the duty of the finder to report the matter to the coroner, and the coroner will hold an inquest with a jury to decide whether the find is in fact treasure trove—for all treasure is not treasure trove. Thus, on 14th August. 1939, an inquest was held at Sutton Hoo, Suffolk, on certain articles of gold and silver found deposited in the earth of a tumulus in grounds occupied by a Mrs. Pretty. Experts pronounced the articles to be of the seventh century A.D., and of great value. At the inquest the jury found that the articles were not treasure trove as there was no evidence to show that they had ever been hidden.

It is the essence of a coroner's inquest that it is held super visum corporis; there must be a body, and the body must be viewed by the coroner, and by the jury if they so wish or the coroner so directs. There may, however, be special circumstances in which a body has been destroyed or is irrecoverable. The Home Secretary may then direct an inquest to be held in the absence of a body. Such a case occurred on 1st June, 1939, when the submarine Thetis submerged and failed to surface in Liverpool

Bay, off Llandudno. All on board perished, and the bodies of the victims could not be recovered.

The term "body" used in the Coroners Acts has never been the subject of legal definition. There may be reported to the coroner the finding of a fœtus, the body of a stillborn child, part of a body, human bones, or a complete skeleton. The usual practice is for the coroner to request a skilled pathologist to examine the remains and submit a report. The coroner will then consider the report together with other material facts relating to the finding and decide whether what has been found is sufficient to constitute a "body" and whether in the public interest an inquest is necessary or desirable.

On 27th August, 1953, human bones were found buried in the garden of 10, Rillington Place, London, W.11. Under the coroner's direction the bones were examined by an experienced forensic pathologist. Evidence given later at the inquest on the reconstructed bones proved them to be the female skeletons of two of John Halliday Christie's six victims.

A coroner is empowered to order a post-mortem examination in any case that is reported to him. The choice of the pathologist rests with the coroner. He may also request a suitably qualified person to make a "special examination" or test to assist him in establishing the cause of death. A doctor may make a post-mortem examination with the consent of the relatives of the deceased, provided that the death is not one that should be reported to the coroner. Refusal of consent by the relatives to a post-mortem is not a reason for reporting the death. If it comes to the doctor's notice that the death has been reported, no examination should be made without the coroner's instructions. Further, if a post-mortem examination has been started on a body in which death is believed to have been natural and during the examination a condition is found which would put the coroner on inquiry, the examination should be stopped, and the coroner informed. Whenever practicable a post-mortem examination should be made by a pathologist experienced in morbid anatomy and with access to laboratory facilities.

In hospital practice it is not unusual for a certain number of deaths to occur in association with surgical and anæsthetic procedure. The Registrar-General's regulations require that any death occurring after an operation necessitated by injury, or occurring under an operation or before recovery from the effects of the anæsthetic. must be referred by the registrar to the coroner. In strict law an inquest is necessary in every case where an operation or an anæsthetic has played a part in bringing about the death. It is, however, generally recognized that were an inquest to be held in every death of this kind, the publicity of the proceedings would tend to undermine public confidence in hospitals. A commonly held view is that if an operation has been usefully undertaken and properly performed, the operation may be regarded as an incident in the treatment, and the death as natural. On the other hand, an inquest will be held where there has been a mishap such as hæmorrhage due to the slipping of a ligature, or an embolism due to the opening of a blood vessel, or where a clear miscarriage of surgery or anæsthesia has taken place. When allegations of negligence are made against the medical or nursing staff the coroner will always hold an inquest, and evidence may be given which will prove the allegations to be unfounded. The



judgment of Lord Justice Denning in a civil action (Roe ν . Ministry of Health (1954)) is worth quoting: "We should be doing a disservice to the community at large if we were to impose liability on hospitals and doctors for everything that happens to go wrong. Doctors would be led to think more of their own safety than of the good of their patients. Initiative would be stifled and confidence shaken. A proper sense of proportion requires us to have regard to the conditions in which hospitals and doctors have to work. We must insist on due care for the patient at every point, but we must not condemn as negligence that which is only misadventure." These words could well apply to a coroner's inquiry into a death associated with surgical or anæsthetic procedure.

The place where an inquest is held will vary with the district. In London and some large towns the coroner has a courtroom of his own. In smaller districts he is allowed the use of the local magistrates' courtroom or town council chambers. Sometimes he will have to sit in a village hall or hospital board-room. Before the case is heard, the coroner instructs his officer to take statements from material witnesses, and submit a report in writing. The attendance at court of witnesses is secured by the service of a summons which, like a supæna, carries with it a penalty for disobedience. A more common and less formal way of calling a witness is to "warn" him to attend by telephone or verbal message. If it becomes necessary to secure the attendance of a witness who is not within the coroner's jurisdiction, it is usually sufficient to send a message informing him that he is an essential witness and that his travelling expenses will be paid to enable him to attend.

It is customary, though not essential, to open the inquest proceedings by a proclamation. Although the language is somewhat antiquated, it is nevertheless impressive and dignified, and reminds those in attendance that the inquest is being held on behalf of the Queen, and the coroner is described as the Queen's coroner.

The coroner usually sits alone, but must sit with a jury in certain specified cases. A coroner's jury consists of not less than seven nor more than eleven jurors usually summoned from the current voters' list. There is no prescribed list, and certain persons are exempt from service by law. Witnesses are examined on oath, first by the coroner and then by counsel or solicitor if present. In general a witness may take any oath he deems to be binding on his conscience. If any witness objects to being sworn and states that the taking of the oath is against his religious belief, or if the holy book of his religion is not available, he may make a solemn affirmation which has the same validity as the oath. A Quaker, for example, is by statute allowed to make a solemn affirmation.

A coroner is not bound by the strict rules of evidence which are observed in other courts; hearsay is admissible and is of value. In simple accidents a statement by a person made shortly after the accident and before death is admissible and may explain the cause of the accident: the note left by a suicide may throw light on the state of his mind or explain the reason for committing the act. If strictly admissible evidence alone were admitted, correct verdicts would in many cases be impossible. When, however, criminal proceedings are likely to ensue, the coroner will adhere to the rules of evidence. The coroner records the evidence by taking sufficient note. Such "notes of evidence" are not read over or signed by the witness. Formal written depositions



are required only in criminal cases and become of importance upon committal to trial from a coroner's court.

Before the Coroners (Amendment) Act of 1926, a person accused of murder underwent what amounted to a trial in the coroner's court before he appeared in the Court of Assize. As the coroner's court is not bound by the rules of evidence, a suspected person might be committed for trial on evidence which could not be subsequently admitted, thereby prejudicing his chances of a fair trial. The Act of 1926 introduced a much needed reform by providing that when a coroner is informed that a person has been charged before examining justices with murder, manslaughter or infanticide (and now by Section 8 of the Road Traffic Act, 1956, with causing death by dangerous driving) he will adjourn the inquest until after the conclusion of the criminal proceedings. In these cases the coroner opens the inquest and restricts himself to finding the registerable particulars and the medical cause of death. The coroner may, but need not resume the inquest. No verdict is recorded. A few cases still occur in which suspicion rests upon a person, and where the police have not sufficient evidence to make a charge. In these circumstances the coroner will hold an inquest with a jury, and evidence may be obtained which will result in a criminal charge against a person and his committal for trial on the coroner's warrant. The purpose of the inquest in cases of this kind is not to determine guilt, but to decide whether there is a prima facie case on which to put a person on trial. This power of the coroner is now rarely exercised.

A coroner's court is not concerned with assessing civil liability. In a number of deaths particularly in those due to industrial and road accidents, it is obvious that someone concerned may be civilly liable in negligence, and the facts given in evidence at the inquest may have to be dealt with later in a civil court action. Counsel, solicitors and others who represent the interest of particular parties have no legal right of audience in a coroner's court, but by the Coroners Rules, 1953, any person who in the opinion of the court is "a properly interested person" is allowed to examine witnesses. Such a person would be a close relative of the deceased, a lawyer, a factory inspector or a trade-union official.

The coroner's court is ordinarily open to the public, but the coroner has a right to exclude them when he considers it desirable. Members of the Press always attend and their newspaper reports of the proceedings by counteracting rumours and giving publicity to the circumstances of the death under investigation serve a useful purpose. The publicity of the proceedings may also expose serious crime. Thus, in 1915, what came to be known as the "Brides in the Bath" case attracted much public attention. A certain George Joseph Smith was executed for the murder of a woman with whom he had gone through a form of marriage. The publicity of the inquest on a third woman who had died in circumstances similar to two women before her, led to information being given to the police by relatives of those women who had been murdered previously by Smith, and this led to his conviction.

After hearing the witnesses the coroner sums up the material facts proved in evidence, signs the inquisition, and announces the verdict. If he sits with a jury he likewise sums up and directs the jury as to the law. The jury will then consider and return their verdict. If the jury are not unanimous, the coroner may accept the verdict

of the majority, provided that the minority does not exceed two. Should there be a total disagreement, the jury are discharged and the inquest re-opened with another jury. The jury need do no more than return their verdict, and having returned it, the coroner must accept it, however perverse it may be. In the event of objections being taken to a verdict application may be made by an aggrieved person to the High Court (under the authority of the Attorney-General), and the Court may quash the verdict, and order another inquest to be held. Juries frequently add a rider to their verdict, in general these riders are useful, occasionally they may be mischievous. Under the Coroners Rules, 1953, riders of exoneration or blame are inadmissible, but riders of a purely recommendatory character designed to prevent the recurrence of dangerous conditions may be recorded. When the jury have returned their verdict they sign the inquisition, as does the coroner, and the inquest is formally closed. The coroner then sends a certificate embodying the findings of the court to the registrar and issues a Burial Order or a Cremation Form.

It is sometimes suggested that the office of coroner should be abolished. Those who hold this view ignore the fact that it must be the duty of some official to investigate in the public interest all unnatural, unexplained and violent deaths. For centuries this duty has been performed by coroners. The coroner is an independant judicial officer, and the Coroners Rules of 1953 have to a large extent codified his procedure. His court is a court of record and its proceedings are open to the public. This publicity is an important feature of the coroner's system. A coroner's inquest may result in the removal of a murderer, may cause the improvement of dangerous conditions in the home, on the roads, in factories and other institutions, it may also call attention to avoidable risks. In some cases neglect on the part of relatives, doctors and employers may be exposed, on the other hand allegations against any of these persons may be publicly exploded.

In his private inquiry, the coroner, by virtue of his powers to order a post-mortem examination, is enabled to establish the cause of many unexplained deaths without the holding of an inquest. Many persons derive great help in the determination of future civil actions and claims for compensation arising out of deaths investigated by the coroner's court. Furthermore, the system whereby the coroner, the registrar, the doctor, and the police work together provides an important safeguard against serious crime. If the coroner's court were to be abolished some other tribunal would have to be set up in its place. The coroner's system as it exists today in general works well and there seems to be no reason to change it.

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MALIGNANCY AND THE ECTOPIC TESTICLE IN ARMY PATIENTS

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Introduction

FOR the past 100 years arguments have raged in medical literature over this particular problem, and it has been said that no greater diversity of opinion exists concerning anything in medicine than the question of malignancy in the undescended testicle. Cases have been reported for a very considerable time, and Storks (1847) reported malignancy in a left inguinal ectopic testicle which he removed. In the same year Arnott (1847) described malignant disease in a right inguinal ectopic testicle, and went on to draw attention to seven other similar cases of which he had knowledge. Johnson (1859) described in detail the clinical history and post-mortem findings in a case of malignant disease in a retained abdominal testicle.

The incidence of malignancy in ectopic testicles has apparently varied considerably in many series of cases which have been reported in medical literature. Thus Kober (1899) reported that 18 of 114 cases of "sarcoma" of the testicle had occurred in undescended testicles, an incidence of nearly 16 per cent. Odiorne and Simmons (1904) reported an incidence of 11 per cent in 54 cases, while Chevassu (1906) also had an 11 per cent incidence in 128 cases. During the years that followed many papers were published giving information on this subject. O'Crowley and Maitland (1919) found that approximately 16 per cent of their series of 57 testicular tumours arose in ectopic testicles, while Southam and Linell (1923) reported a figure of almost 18 per cent occurring in 45 cases. Other figures were given by Dew (1925) 5 per cent in 40 cases, Cairns (1926) 6 per cent in 77 cases, Hinman and Benteen (1936) 7 per cent in 40 cases, Gordon-Taylor and Till (1938) 30 per cent in 50 cases, and Higgins and Buchert (1939) 8 per cent in 83 cases.

Gilbert and Hamilton (1940) appeared to produce a definite and unequivocal answer to this problem when they reported a collected series from medical literature of over 7,000 cases of malignancy of the testicle, amongst which 840 had developed malignancy in an undescended testicle. This gave an incidence of approximately 11 per cent. At the same time these authors collected figures to show that amongst 9,741,097 military recruits, 22,665 had an undescended testicle, an incidence of 0.23 per cent. They wrote "that 11 per cent of all testicular tumours occur in the 0.23 per cent of the males who are cryptorchids, proves that neoplastic growth is found far

more commonly in the ectopic than in the scrotal testis, about 48 times more than expected by chance association."

Campbell (1942) in a similar study collected 1,422 cases of testicular malignancy and found that in 165 of these cases, malignancy had developed in an ectopic testis, an incidence of over 11 per cent. Campbell carried out a statistical analysis of the figures available and confirmed the findings of Gilbert and Hamilton (1940).

These figures and conclusions have been largely accepted by later writers such as Dixon and Moore (1953) who, however, reported in their own series that only 24 of 990 cases of testicular neoplasm developed in an ectopic testicle. Patton and Mallis (1959) stated that just over 5 per cent of their series of 510 cases of testicular malignancy in American Servicemen also developed in undescended testicles.

Carroll (1949) threw some doubt on previously published papers. Carroll questioned 662 urologists on whether they had ever seen or treated malignant cryptorchidism. Seventy-six per cent of the urologists questioned had never seen such a case. Carroll did not carry out a statistical survey but, basing his argument on the answers received by him from urologists and on certain published papers, declared, "statistics as previously published cannot be accepted, because there is a reasonable and justifiable doubt as to the accuracy of the factual premises upon which they are based."

Campbell (1959) analysed all the figures generally available and found that in a total of 12,535,824 Army recruits examined, 35,091 were found to have non-descent of one or both testicles. This gave an overall percentage of the incidence of undescended testicle to be 0.28 per cent in the adult male population. Campbell (1959) attacked the paper written by Carroll in 1949 on the grounds that he had misquoted various authors, and that, additionally, the survey carried out by Carroll could have little significance on statistical grounds.

The operations of orchidopexy and orchidocleisis have been performed many times in the treatment of undescended testicles. Cunningham (1921) reported a case of teratoma of the testicle occurring five years after successful orchidopexy. Gordon-Taylor and Wyndham (1947) reported six cases of malignant disease in testicles brought into the scrotum by orchidopexy and two cases of malignancy supervening in inguinal testes which had been placed in the abdomen by orchidocleisis. Hickin-botham (1950) mentioned two cases of teratoma of the testicle occurring three years and twelve years respectively after orchidopexy. Other authors such as Grabstald, Rhamy, and Dryden (1957), Melicow (1956), and Patton and Mallis (1959) have reported similar cases.

Gordon-Taylor and Wyndham (1947) suggested that in view of the frequency of the operation of orchidopexy, and the relative fewness of cases of malignant change following this operation, some protective agency came into play in a testicle successfully placed in the scrotum by operation. Stephen (1960) advised the careful palpation at operation of all mal-descended testicles considered suitable for orchido-



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pexy, to exclude the presence of tumours, and the subsequent careful follow-up of such patients for several years.

Material Studied

The case notes of 135 Army patients with primary malignant tumours of the testicle were available for study. The series comprised 87 patients with a teratoma of the testicle and 48 with a seminoma of the testicle. Tissue or histological slides were available from all patients and the diagnosis was confirmed histologically in each case.

Findings

Nine of the 135 patients had a history of undescended testicle. However, in two of these cases the undescended testicle remained free from disease, while the opposite normally descended testicle was the seat of a teratoma in one case and a seminoma in the other. Of the remaining seven patients with a history of mal-descent who developed malignancy (an incidence of just over 5 per cent) five had teratomas in their ectopic testicles, while two developed seminomas. Three of the patients developed teratomas in testicles placed in the scrotum by orchidopexy. These tumours developed at intervals of six, nine, and 27 years respectively following operation. The interval of 27 years appears to be the longest interval yet recorded of malignancy following orchidopexy. Jaswon (1959) noted a case of teratoma of testicle occurring 25 years after successful orchidopexy. The long interval which may elapse before malignancy supervenes, emphasizes the importance of the follow-up advocated by Stephen (1960), in all cases where orchidopexy has been carried out.

In two of the seven cases, malignancy was discovered by routine histology carried out on undescended testicles removed during hernia operations. Pace and Cabot (1936) also found two unsuspected tumours in 24 undescended testicles which had been excised. These figures emphasize the importance of the histological examination of all testicles removed at operation even though they may appear atrophic and useless.

Discussion

There would appear to be no reasonable doubt that the presence of an undescended testicle increases the liability of the patient to develop malignancy, and the figures obtained in this present study support the contention of authors such as Gilbert and Hamilton (1940) and Campbell (1959). The incidence of just over 5 per cent found in this study although statistically significant, is lower than the figures given by many other authors. This, however, may be due to the fact that the present series is to a limited extent selective, as patients with bilateral cryptorchidism are not accepted by the Army for military service. However, the figures obtained were almost exactly the same as those of Patton and Mallinson (1959) who studied cases occurring in the American Armed Forces



Summary

Previous literature regarding the relationship between malignancy and the ectopic testicle is briefly reviewed. A series of 135 primary malignant testicular tumours occurring in Army patients has been studied and the incidence of malignancy supervening on an ectopic testicle estimated. Attention is drawn to the importance of a long "follow-up" in those cases where an undescended testicle is treated by orchidopexy. In cases where excision of an ectopic testicle is carried out, the importance of a histological examination of such testicles is emphasized.

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PARACHUTE MEDICAL SERVICES

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NATIONAL Service is almost a thing of the past. Nearly everyone will be pleased to see the end of this political bone of contention, although strangely some of our soldiers have said that they think it has been a good thing as it has given chances they would not otherwise have had.

Today there are two main choices for the newly qualified doctor. He either commences on the long hard path to specialization or enters the field of general practice. One often wonders if the fit young men, who have been used to a life of games, clubs and societies in their university, do not feel that it is rather too soon to settle down. Surely some still seek adventure—our profession will be the worse if none do. Adventure is still to be found by those who seek it—in the Services, The Colonial Service, Missions, The Merchant Navy, overseas appointments and a few expeditions. The Parachute Medical Services offer an opportunity for those who are not yet ready to settle down.

British Airborne Forces were formed on 22nd June, 1940, on orders from Sir Winston Churchill. Officers and men of the R.A.M.C. and R.A.D.C. soon volunteered and served gallantly during the war with the 1st and 6th and Indian Airborne Divisions. One of the four airborne recipients of the Victoria Cross was a medical orderly—Corporal Frederick George Topham—of the 1st Canadian Parachute Battalion, who showed extreme gallantry at the battle of the Rhine Crossing.

After the war we lost our famous divisions and from them was formed in Palestine the regular army's only Parachute Brigade. 16th Parachute Brigade Group has since progressed and expanded, serving throughout the Cyprus emergency against the terrorists, at Suez, Jordan, and more recently Kuwait. The regular battalions still have their regimental medical officers, and supporting the brigade since its formation has been the 23rd Parachute Field Ambulance.

In 1948 the Territorial Army produced an airborne division and many will remember the field ambulances in London, Liverpool and Birmingham. This division shrank to a brigade when the Territorial Army was streamlined but the field ambulance still exists, as 44th Parachute Field Ambulance (T.A.).

The 23rd Parachute Field Ambulance is a busy and a happy unit. It is not really surprising that the morale is high when it is composed entirely of volunteers and of young men who are fit and who get plenty of opportunity to keep fit. They are kept busy and feel that they are doing a worthwhile job and a job that offers variety and a chance to travel about the world. A great step forward which the unit has recently achieved has been the removal of the worry of sudden postings. Both officers and men

can now, if they wish, join to serve with airborne only—if they prove unsuitable they are able to return to civil life.

Volunteers who come either direct from civil life or from other units in the service have first to prove themselves on the pre-parachute selection course. This is a tough course, run by The Depot of the Parachute Regiment and Airborne Forces, and is irrespective of rank. After an initial two weeks of fitness training under the Army Physical Training Corps instructors, the men undergo a tough two weeks of selection testing. All arms, including medical personnel, have a failure rate of about 50 per cent. There is no doubt that the Parachute Brigade is far better for having this high standard. The course is designed primarily to test "guts" and staying power, with which is associated physical fitness, agility, confidence, intelligence, leadership and endurance. The basic requirement is tested by long runs (in boots and steel helmets) and work in the gymnasium. Variety is provided by milling, the assault course, confidence tests high above the ground and the swimming baths. The fortnight ends with a 48 hour exercise in the Welsh mountains to test endurance.

Those who pass this course then gratefully retire to the less energetic Parachute Training School at R.A.F. Abingdon. They spend a month here, starting with ground training and air experience. The first two parachute jumps are from a captive balloon at 800 feet, and thereafter men jump from Hastings, Beverley or Argosy aircraft. The last jumps are made carrying equipment, one of which is at night. Officers and men after these eight descents are entitled to parachute wings and parachute pay and are ready to start their life with the Parachute Field Ambulance.

The Parachute Brigade has to be ready to go anywhere at any time and to deal with almost any situation. Its medical support must therefore be pretty versatile.

The field ambulance is divided into:

- (i) A small headquarter section with clerks, cooks and storemen;
- (ii) The casualty collecting sections;
- (iii) The transport section and
- (iv) The surgical and dental teams.

It has already been stressed that all ranks must be fit. They must also maintain a high standard of field craft, shooting, map and compass work, learn to look after themselves in the field under any conditions, keeping efficient and knowing all aspects of air training. In the event of a quick move, men have to know how to pack their medical and personal equipment in the shortest possible time, arriving at an airfield a few hours after being alerted. A certain amount of experience is required to pack exactly the correct items, within the considerable weight limitation, to enable things to be kept running efficiently for the period of the parachute operation.

The surgical teams spend the greater amount of their time working in their specialities. At present the unit takes responsibility for some of the orthopædic work at the Cambridge Military Hospital. The commanding officer and the surgeon to the brigade have out-patient and operating sessions, and in the theatre are assisted by the unit anæsthetists. The men are trained as operating theatre technicians and are fully capable of running the theatre and scrubbing up. It is very important to maintain the men's interest and training by allowing them to assist in operations.

The point of maintaining interest applies particularly to the medical officers. We believe that unless a doctor can be given some real medicine in addition to the more adventurous type of training, he will not be interested in joining. There is no shortage of orthopædic work amongst the army and its families, and at present the Cambridge Military Hospital takes many of the civilian road accidents in the area. The surgeon is responsible for his share of these cases, and is assisted by one of the section medical officers. The anæsthetists, of course, are employed on the hospital rota and do their share of all the lists. One of them usually works full time in the hospital whilst the other divides his time between hospital and unit activities.

The army has an excellent opportunity to take what should be its proper place in the country's medical services. We cannot, with a practice of fit young men and women, hope to compete in many branches of medicine. However, in our opinion, it is time that the Corps tried to make its presence felt in some clinical field. We are in a position to be considered experts, and indeed we are, in Army Health. Accident Surgery is also our role and there is a great chance at present to develop this field. If we join in the country's accident service we too can produce new work, train all ranks and offer an attractive career to those who rightly want to practise clinical work. One still meets people who are against the army medical services treating civilians. It is not a choice, it is a question of survival and moral obligation.

The general duty medical officers are employed as far as possible in hospital, being allowed to work in a speciality of their choice. They have unit commitments also, and they join the sections for exercises with the remainder of the brigade. The sections are commanded and trained by senior N.C.O.s.

The surgical team equipment presents an interesting problem. The full entitlement weighs about three tons. In a parachute operation we can only take what will go in a Land Rover trailer and what six men can carry. The surgeon and anæsthetist have to decide exactly what will be taken and how it will be packed. This can be a fascinating study and at present the standardization of dry batteries is under review. It was found that linen operating towels were too heavy and too bulky, many materials were tried including paper and plastics. The ideal towel is made of woven nylon, parachute nylon in fact, and by using this material an operation pack of five towels, sponges, needles and knife blades weighs $6\frac{1}{2}$ oz. against $2\frac{1}{2}$ lb. if linen towels are used. This means that the team can take with them sufficient packs for 30 operations. Sponges are used to save the great bulk of gauze swabs.

Where necessary all articles are pre-sterilized before packing; after use, of course, instruments will have to be boiled. Difficulty was encountered in finding a suitable wrapper in which to autoclave articles, and in avoiding rusting of needles and blades. These problems have now been overcome by the use of gamma ray sterilization, articles being sealed in polythene bags.

The anæsthetic machine we use is the "EMO" developed from the wartime Oxford Vaporizer. The patient's inspirations draw air over ether. It is hoped very soon to be able to modify the machine in order to use Fluothane, although there are still arguments against its use for shocked patients. It is the policy to pass an endotracheal tube on every patient (the British soldier's stomach is always full of food and tea) and individual anæsthetists bring with them the drugs of their choice. Another



The mountain rescue team recovering a casualty.



Medical officer and orderlies unloading a casualty from a Whirlwind helicopter.

advantage of this machine is that the ether/air mixture is not inflammable as there is a potential danger from the sterilizers, lamps and static from the nylon towels.

In the casualty collecting sections the equipment is much less specialized but packing problems still exist. Considerable advantages and weight-saving have been made by the use of plastics. We have replaced stainless steel by plastic for feeders, urinals, bedpans, medicine glasses, bowls and kidney dishes. Not only are plastic articles cheaper but they are quieter, do not dent and in rough usage last longer.

The equipment is packed in Bergen Rucksacks, and when the parachute is open the man releases the rucksack until it hangs on a nylon rope 20 feet below him. Unless great care is taken in packing, articles will be damaged on landing. Proper packing is part of the training. The most difficult articles to protect are the many vials of sterile water for mixing with various drugs.

The unit has several other activities, designed to vary training and to provide interest. There is a mountain rescue team which includes some good rock-climbers, and which from time to time trains with the R.A.F. mountain rescue teams and the Army outward bound school. The team has made several rescues, and last year was able to purchase a Thomas Stretcher from a Nuffield Grant.

A dog, about which there was a fair amount of publicity earlier this year, was added to the unit primarily to help the mountain rescue team. The dog was trained by the Royal Army Vetinary Corps and will search an area and lead his handler to any casualty; the casualty being recognized by the dog as someone lying down. Two men have been trained as handlers and are now very fond of the animal. In battle such a dog could be a great help in finding an injured man avoiding the necessity of large numbers of men in search parties, and being less obvious to the enemy than a man. At the moment the dog is being trained to parachute and his ground training is proceeding very well. As soon as a special harness and parachute have been made it is hoped that he will earn his wings.

Ski-ing is always popular and during the winter sections go to Scotland for a week where they combine their normal training with winter warfare and survival courses.

Sport is one of the best ways to keep fit and everyone in the unit must play a game. Each week during the winter teams play rugby, soccer, hockey and basketball and there is keen competition for the various league and knock-out competitions.

Athletics, boxing and swimming are also entered in their turn. There is also a subaqua club which much prefers to operate in such places as Cyprus.

The canoe club is a new venture, and the officer who formed it took a team of four from the unit on an adventure training scheme last year. These schemes have to be made without any expense to the Army and it is extraordinary just what can be done at little cost if initiative is shown. The team managed to get a lift with the R.A.F. to the Sudan, and canoed down the Nile 1,000 miles from Khartoum to Wadi Halfa.

The Kuwait operation last summer involved some of our men, and we learned a great deal about how to live in a hot climate. The hottest day was 135°F with sand temperatures of 175°F. The number of heat casualties was extremely low, largely due to the fact that men knew that they must drink up to 20 pints per day—that you cannot be trained to do without water.

The activities of the 23rd Parachute Field Ambulance carry men from this heat to



an exercise held the year before last in Norway in the Arctic Circle. Most years there are two exercises held overseas and altogether the unit enjoys life.

The unit is almost up to strength, gets plenty of variety and excitement, and is extremely fortunate these days in being able to function properly. There is no shortage of junior ranks but there has always been a shortage of regular senior N.C.O.s and officers. One would imagine that it would be the ambition of a young regular to command this unit, with all the opportunities it offers. It is worrying to think that for officers we must look to civilian life. Has specialization and promotion prevented young officers from facing the challenge of trying to join one of the units which can offer both practical medicine and the real army life?

INTERNATIONAL CONFERENCE OF ORAL SURGEONS

THE first International Conference of Oral Surgeons was held at the Royal College of Surgeons (Eng.) from 1st to 5th July, 1962, and the Directors and several specialist dental officers of all three Services were able to attend.

On 5th July, a number of hospitals in and around London were invited to present clinical demonstrations and to be "at home" to groups of delegates, and such a request was made to the Armed Services.

In response, by kind permission of the D.G.A.M.S., the three British Armed Forces Dental Services were able to produce at the Royal Army Medical College, Millbank, a series of static demonstrations showing the work of dental officers in the field of oral surgery. These covered such aspects of the subject as:

The modern treatment of fractures of the facial skeleton.

The treatment of tumours of the jaws, dental and non-dental.

The removal of misplaced teeth.

The surgical correction of facial deformities.

The management of acute infective conditions.

The repair of cranial defects.

In addition, a number of recently completed cases were presented, with the patients in attendance.

This clinical display was visited by some 25 delegates of various nationalities, who were afterwards conducted around the Royal Army Medical College and then entertained to lunch in the mess.

The Directors of the Royal Navy, Army and Royal Air Force Dental Services gratefully acknowledge the facilities granted to them by the D.G.A.M.S., for this function at the Royal Army Medical College and in the R.A.M.C. Headquarters Mess.

D. V. TAYLOR



ARTERIO-VENOUS FISTULAE

R. S. TAYLOR M.B., B.S., M.R.C.S., L.R.C.P.

Late Captain R.A.M.C.

ARTERIO-VENOUS fistulæ occur with considerable frequency, and, in the great majority of cases, are traumatic in origin, single, large and localized. They may be situated anywhere in the body. The localization of the lesion means that generally a surgical cure can be effected. Congenital arterio-venous fistulæ, on the other hand, are relatively uncommon. They are considered to include all non-traumatic vascular abnormalities in which arterial blood passes into the venous system without having to pass through a capillary bed. In many cases there are multiple communications presenting a much more difficult problem in treatment. The head and neck are the most usual sites involved, with the extremities next in order of frequency.

We are reporting the following case:

Case history: a private W.R.A.C. aged 21 years complained of unsightly dilated veins on the right hand and that her right arm was longer than the left (Figs. I and II).

History:

Nine years ago: at the age of 12 years she received a severe blow on the left side of her head after falling out of a lorry. Following this, she was unconcsious for several hours and was admitted to hospital. No other injuries at the time. Since then, her attention was drawn to the fact that her right arm was markedly longer than the left. She admitted, however, "It is quite possible that they have always been different."

Over the last two years: she had observed the gradual appearance of dilated veins on her right hand and arm.

General health very good: she is right-handed. No complaints attributable to right hand or arm, apart from the unpleasant cosmetic appearance. No pain or parasthesiæ in hand, arm or shoulder, no symptoms attributed to the cardio-vascular system. She is employed as a waitress and is able to perform normal work without any difficulty.

On examination: healthy-looking girl with no abnormality of cardio-vascular respiratory, nervous or abdominal systems.

Arms: the right upper limb was obviously larger than the left and considerably warmer, with an increased amount of sweating. There were dilated veins present over the dorsal and palmar surfaces of right hand and fingers (thumb and forefinger excluded). Port wine stains were present on ulnar side of right palm and on the palmar surface of fingers of right hand (thumb and forefinger excluded). The right radial artery was very superficial with pulsation visible just deep to the skin.

Brachial and subclavian pulses were equal on both sides.

Machinery murmur: heard over right ulnar artery at wrist and over the right palm. No subclavian bruit.

Blood pressure: right arm 120/75 with rapid development of cyanosis and pain on inflating the cuff. Left arm 120/70—painless.

Branham's reaction: right brachial arterial pressure reduced pulse rate from 88 to 76/min. (Localized exclusion of fistulæ not possible—brachial cuff applied).

Dimensions: the right arm was 5 cms. longer than the left, the difference in length being mainly below the elbow. Similarly, diameters of palm and forearm were approximately 1.5 cms. greater on the right.

Tone, power, co-ordination and sensation were normal and equal both sides.

Hæmoglobin-92 per cent.

Chest X-ray—no cardiomyopathy.



X-ray of hands shows enlarged vascular channels in bones of right little finger and right ring finger. E.C.G. normal (Fig. III).

Oxygen saturation studies: results technically unsatisfactory but venous blood resembled colour of arterial blood.

Subclavian arteriogram: multiple arterio-venous fistulæ of right forearm and hand.

Discussion

The ætiology of congenital arterio-venous fistulæ has been summarized by Doctor Florence Sabin as follows: "The anomaly of direct anastomoses between arteries and veins brings up an interesting point in the development of the cardio-vascular system. Arteries and veins differentiate from a common capillary plexus in the embryo, and vessels which have served as embryonic arteries may later become veins and vice versa." The effects of such arterio-venous fistulæ may be classified as local, regional and systematic. Naturally there will be considerable variation between different cases according to the number and size of communications present.

The local changes are seen in the blood vessels directly involved. The abnormal flow of high pressure arterial blood directly into the low pressure venous system results in the development of large, engorged, tortuous veins. Clinically this results in two fairly constant diagnostic features; the presence of a palpable thrill and an audible bruit lasting throughout the whole of the cardiac cycle and heard in the region of the shunt. This is the well-known "machinery murmur." It must, however, be pointed out that in those cases with extensive minute fistulæ, the murmur tends to be heard in systole only. It is most likely produced by turbulence of blood in the dilated arteries and not to the passage of blood through the multiple fistulous communications, as these would be far too small to produce a murmur. Associated with this is a dilation and thinning of the walls of the arteries proximal to the shunt, and the suggestion



Figure I. Dilated veins on back of right hand.

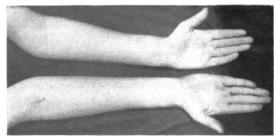


Figure II. Right arm 5 cms. longer than the left.



Figure III. Vascular channels in bones of right ring and little fingers.

that this is due to deficient arterial nutrition probably receives most support. The arterial dilation takes place as a result of the increased blood flow and this in turn causes compression of the vasa-vasorum and so ultimately thinning and degeneration of the arterial wall.

The regional changes are those affecting the entire limb. The increased blood flow occurring before epiphyseal fusion has taken place, may result in an abnormal increase in both the length and the girth of the limb, but it is interesting that in many of the reported cases there is only a small difference in size from the normal limb. The elevated blood flow also causes a measurable increase in the temperature of the affected limb. A third and clinically important regional effect is the development of trophic changes distal to the arterio-venous communication. This is a hypoxic effect since the presence of the shunt means that much of the oxygenated (arterial) blood never actually reaches the distal capillaries. It is possible that some of the blood which does reach the distal capillaries, passes back into a peripheral artery, owing to local pressure changes in the presence of multiple arterio-venous connections, thus forming a "closed circuit" with no opportunity of the decreased "peripheral resistance" offered by the shunt. The decreased peripheral resistance may produce a fall in the blood pressure if the shunt is of sufficient size. To compensate for this and in an attempt to maintain an adequate peripheral pressure, there is an increase in circulating blood volume, and in cardiac output. Thus if the diversion of blood is extensive then the increased load on the heart can lead to cardiac failure. In practice this is very rare in peripheral fistulæ. The compensatory rise in pulse rate forms the basis of Branham's sign in which occlusion of the main feed artery results in a drop in pulse rate.

In our case clinically and radiologically the ulnar artery and its branches are the most involved. Treatment by ligation of the individual shunts would be surgically impractical, if not impossible, and ligature of the ulnar artery may well jeopardize the peripheral blood supply to the fingers thus, perhaps, precipitating the onset of gangrene, but in any case, would only be of very temporary value in view of the prolific collateral supply. At present we consider that since her only symptom is the unpleasant cosmetic appearance of the hand, then the best source is to avoid operative interference and do nothing, if in later years gangrene or much less likely cardiac failure should supervene, then some operative procedure would become essential.

Adams (1951) reports several cases of children with multiple arterio-venous fistulæ of the legs in which the only possible treatment was amputation through the groin. An almost identical case to our case above was reported by Flynn and Mulder. The patient was a girl of 20, but presented with gangrene of two fingers. Treatment by brachial artery ligation produced no improvement, and eventually amputation was required.

In conclusion, it should be pointed out that any young patient presenting either with marked unilateral-varicose veins of the leg or gangrene of the fingers, should be considered as a congenital arterio-venous fistulæ until proved otherwise.

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A BRIEF REVIEW OF CASES OF TYPE B INFLUENZA IN ALLIED TROOPS

admitted to a military hospital in Belgium from November, 1945, to January, 1946

Colonel JOHN MACKAY-DICK

O.B.E., M.B., F.R.C.P.E., late R.A.M.C.

In Belgium in late 1945 there was an outbreak of Type B Influenza. My hospital admitted its first three cases on 24th November, 1945, and within seven days 78 cases in all had been admitted, and observations on a total of 355 consecutive cases treated in the period 24th November, 1945, to 14th January, 1946, are given below.

The presenting symptoms and signs were as follows:

Sudden abrupt onset of a short-term febrile illness with shivering, headaches (frontal, retro-orbital and eye ache), dizziness, muscle and joint pains, apathy, marked weakness and anorexia, sore throat and a harsh, dry, frequent, irritable barking and unproductive cough. Also signs of tracheitis with minimal bronchitis. All patients were feeble and weak when they first got out of bed (48 hours after the end of pyrexia in uncomplicated cases) and took several days to find their feet. In addition, the irritable cough persisted in some cases for several days.

The white blood cell counts, total and differential, were within normal limits in the uncomplicated cases and showed no distinctive features. The systolic blood pressure in some of the uncomplicated cases fell as low as 100 mm. of Hg and these patients complained particularly of feeling "played out." There were many such cases among the older subjects. They just wanted something to relieve their headaches, aches and pains, and to be left to lie and sleep undisturbed.

Uncomplicated Cases (225 out of 355 patients, i.e. 63.38 per cent).

(a)	Average duration of pyrexia	 3.36 days
(b)	Average number of days before they were admitted to hospital	 2.98 days
(c)	Average number of days spent in hospital	9 59 days

As regards (c) it must be remembered that the stay in hospital was largely determined by the need for beds. So most patients on return to their unit were ordered 4-7 days attend C, i.e. no duty, as well as 3-4 days attend B, i.e. light duty. Only at the discretion of the unit M.O. did these cases return to full duty on completion of these instructions.

Number of cases showing other features or complications in addition	•••••	130 i.e. 36.62 per cent	
These additional features were:			
Laryngitis—with almost complete loss of voice			32 cases
Sinusitis—radiologically confirmed in a few cases			29 cases

Lymphoglandular Enlargement—This involved essentially the tonsillar and posterior cervical glands but sometimes, as well, the axillary and/or inguinal glands were enlarged but never the epitrochlear glands. It was in five such cases that the spleen was palpable but repeated white blood cell counts, total and differential, did not indicate infectious mononucleosis (glandular fever) but unfortunately the Paul Bunnell Reaction was not carried out.

Diarrhæa and Vomiting					•••••		•	15 cases	
Otitis Media—two of these	cases r	require	d myrin	gotomy				5 cases	
Dry Pleurisy	•					,		5 cases	- 1-, -
Splenomegaly								5 cases	
Epistaxis				,			******	5 cases	
Cyanosis				*****		*****	*****	2 cases	
Pleurisy with Effusion and	d pred	lomina	nce of	polymo	rphon	uclear	leu-		
cocytes					•••••		•	l case	
Lobar Pneumonia—(radiole	ogical	diagno	sis)	*****		•	•••••	6 cases	
Average W.B.C.			13,15	0/cmm.					
Maximum W.B.C.			18,30	0/cmm.					
Minimum W.B.C.			8,80	0/cmm.					
Lobar Pneumonia with Dry	Pleuri	isy					•••••	3 cases	
Average W.B.C.			13,30	0/cmm.					
Maximum W.B.C.			17,80	0/cmm.					
Minimum W.B.C.		******	7,60	0/cmm.					
Lobar Pneumonia with clea	r effusi	ion wit	h polyn	norphor	nuclear	leuco	cytes		
in abundance			*****	******		*****		1 case	
W.B.C.		******	13,40	0/cmm.					
Lobar Pneumonia with Em	pyema				*****			2 cases	
One of these cases necess	sitated	rib re	section	and dr	ainage	follo	wing re	neated aspiration	n and
intrapleural penicillin as wel									
the other case cleared up with		•		•			-	,	
Broncho Pneumonia		•						5 cases	
Average W.B.C.			14 10	 0/cmm.	•••••	******		J cases	
Maximum W.B.C.				0/cmm.					
Minimum W.D.C			•	0/cmm.					
Broncho Pneumonia with L			•					2 cases	
The white blood cel							 m recn		
D.,								16 cases	
Average W.B.C.	******	*****	7 04	 0/cmm.	*****	•••••		10 Cases	
Maximum W.B.C.				0/cmm.					
Minimum W.B.C.				0/cmm.					
Millimmulli W.B.C.			٦,١٠	w/ciiiill.					

All cases of lobar pneumonia, broncho pneumonia and pneumonitis complicated or uncomplicated were treated with sulphathiazole by mouth or penicillin intramuscularly or both at one and the same time. In none of the pneumonia cases without pleurisy, etc., was there a sudden drop of temperature under the drug therapy adopted. There was found to be no definite correlation between the response to treatment with sulphathiazole and/or penicillin and the degree of polymorphonuclear leucocytosis in the peripherial blood or sensitivity of the predominant organisms in the sputum. The inference was that although the secondary invader was being controlled by sulphathiazole and/or penicillin the initial invader, namely the virus of influenza, remained relatively unaffected. Only 15 out of 355 cases showed gastro-intestinal symptoms. In this epidemic one system was predominantly affected. There were no fatal cases.

As a rule with such cases, therapy with sulphathiazole 4 hourly with an initial loading dose was instituted at the beginning; but in view of the apparently very slow response to such treatment as evidenced by persistence of pyrexia, etc., almost every case was given penicillin intramuscularly in dosage (20,000 units 3 hourly), which

would be considered very modest today. In two very ill cases, penicillin was given in doses of 60,000 units intramuscularly 3 hourly. Sulphathiazole and penicillin were used together in view of their recognized synergic action. In those days there was no erythromycin, no novobiocin or cortisone.

Unlike the R.A.F. cases (Gilroy 1957) and the Army Chest Centre series of viral respiratory infections (Mackay-Dick and others 1955) every case did not have a radiograph of the chest. I feel that a better descriptive term for the pulmonary opacities than segmental aspiration pneumonia would be segmental (or zonal) atelectasis due to adhesive bronchial pneumonia.

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1963 DIARY

April, 1963 R.A.M.C. Golfing Society, Spring Meeting at the Berkshire Golf Club. Friday 19th Wednesday 24th R.A.M.C. Annual Dinner, which will be held in the Headquarters Mess, Millbank. June, 1963 Friday 21st R.A.M.C. "At Home," Headquarters Mess, Millbank. R.A.M.C. Corps Sports. Saturday 22nd Sunday 23rd R.A.M.C. Corps Sunday. Drumhead Service at the Depot and Training Establishment, R.A.M.C. R.A.M.C. Golfing Society, Summer Meeting at the North Hants Golf Club, Fleet. Monday 24th October, 1963 Tuesday 1st R.A.M.C. Golfing Society, Autumn Meeting at the New Zealand Golf Club. West Byfleet.

A CASE FOR THE ADOPTION OF DISPOSABLE SYRINGES

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THERE is as yet no uniformity of opinion regarding the advantages of adopting disposable syringes in general and hospital practice. This paper seeks to examine the case for the adoption of disposable syringes, in the light of experience gained in a Central Sterile Supply Department serving a group of army hospitals and medical centres.

The Central Sterile Supply Service at the Cambridge Military Hospital, Aldershot, supplies sterile syringes and packs to 5 hospitals and about 75 medical centres, and this distribution involves rail and road deliveries up to a distance of 60 miles. Formerly, non-disposable syringe needles were supplied either separately or placed in the container with the shafts and points protected in a glass tube, but since January, 1962, pre-sterilized disposable needles with plastic hubs have been supplied separately and have been discarded after use.

The syringes supplied are all glass B.S.S. syringes, sizes 2, 5, 10 and 20 ml. with non-interchangeable barrels and plungers. They are sterilized and issued in robust London Hospital pattern aluminium containers. New syringes are siliconized before being put into circulation. Used syringes, when returned to the Central Sterile Syringe Department, are removed from their containers, inspected and the barrels separated from the plungers, soaked in a soft soap or cetrimide solution then scoured on a syringe brushing machine. This is followed by two rinses, the first in tap water, the second in deionized water. They are then dried in a hot-air oven, cooled and re-assembled. In the meantime, the metal containers are stripped of labels and sealing tape, scoured, rinsed and dried in an oven. The syringes, protected with silicone rubber rings, are then replaced in the metal containers and sterilized in an electric hot-air oven at 180° centigrade for one hour.

The time taken for this "processing" naturally varies with the Central Sterile Syringe Service's methods and equipment, and with the skill of the technician. An average time schedule for one technician to process 48 syringes is given below:

	Proces		Time (minutes)				
1.	Removing syringes from 48 con	tainers,	inspec	tion an	d strip	ping	10
2.	Washing and brushing syringes						10
3.	Rinsing in running tap water	****					5
4.	Immersion in deionized water		****	14411			5
5.	Drying in hot-air oven			****			25
6.	Cooling		*****	** **		****	12
7.	Washing of containers			*****			20
8.	Drying of containers in hot-air	oven		****	****		25
9.	Inspection and assembly	***			****		13
10.	Hot-air oven sterilization (180°	centigra	ide)				60
11.	Cooling						12
12.	Sealing and labelling			** **			5
	Total time for	r one m	an to p	process	48 syri	nges =	$=$ $\overline{202}$ (3 hrs. 22 mins.)

A variable but generally high breakage rate of glass syringes is incurred during processing, distribution and return, and in clinical use. Replacement of damaged syringes is irregular and does not keep pace with demand. This, and occasional Central Sterile Supply Service staff shortages caused by postings, leave and sickness, interferes with the supply of an adequate number of sterile syringes to certain medical centres whose supply is once, twice or thrice weekly. When a medical centre is faced with any irregularity in supply of sterile syringes, or with a sudden demand for mass immunization, there is a tendency for syringes to be boiled until replacements arrive. Boiling is an unsatisfactory method especially when carried out by medical orderlies of varying reliability; this sort of incident tends to jeopardize a central sterilization system and to bring it into disrepute.

Elementary mistakes occur especially with changes in staff in the syringe room. Syringes can be under- or over-siliconized, or stained, and occasionally barrels and plungers are mis-matched; this can be irritating to the user and galling to the Central Sterile Supply Service Superintendent.

The above factors, i.e. time, manpower and transport involved in the processing and distribution of sterile glass syringes, the breakage rate and staff problems, make the adoption of disposable, non-breakable syringes a welcome prospect. The adoption of disposable syringe needles has been welcomed by users and has reduced the work of the Central Sterile Syringe Service.

Most doctors and nurses have been accustomed by training to use glass syringes and to sterilize them by boiling. The obvious advantages of Central Sterile Syringe Services led to their widespread adoption, but the distribution and return of syringes has not generally matched the improved standard of sterility achieved, especially where the Syringe Service distributes outside the hospital in which it is located. Shortcomings in the distribution and collection of syringes have led to demands for large holdings of sterile syringes, and where this has not been met, boiling has been resorted to in desperation. It must be accepted as a basic principle, that if a Central Syringe Service is established, the regular and adequate supply of sterile syringes to the right place at the right time is as important as sterility.

In considering the advantages of disposable syringes, certain basic requirements have to be kept in mind:

- (a) Sterility.
- (b) Efficiency.
- (c) Economy.

The sterilization process must of course be efficient, but equally important is the necessity to preserve the sterile state by efficient packaging. Disposable syringes made of plastic materials can be efficiently sterilized in bulk by irradiation or ethylene oxide. The ideal package to preserve the sterility of the sterile disposable syringe, taking into account economy, has not yet been devised, but great improvements have been achieved in devising packages which withstand stress, storage and resist pin-hole puncturing and moisture absorption. Such packages have also taken into account ease of opening and withdrawal of the sterile syringe without contamination.

To be efficient a syringe should have a well-fitting barrel and plunger with clearly

visible and accurate dose markings on a translucent barrel of adequate length to prevent the plunger from coming apart when withdrawn. The syringe should also be easy to charge. The plastic material should be such as not to react chemically with the fluid to be drawn with the barrel. One make of 2 ml. plastic syringe tested was not long enough, and separation of the withdrawn plunger resulted, with consequent loss of some of the barrel contents. Another failed to deliver the dose indicated by its markings. Such criticisms have now been overcome in the more reputable makes.

A glass syringe is not cheap, and its alleged economy depends on repeated use after careful processing and sterilization. The syringe nozzle is the most difficult part of a syringe to clean, even in an ultrasonic washer, and a disposable plastic syringe obviates this necessity. The breakage rate of glass syringes can be high in processing and in use, distribution and collection. Adoption of plastic syringes eliminates the hazards of cleaning, breakage and of collection, although it is to be admitted that discarding such syringes poses a problem of disposal and destruction.

The price of plastic sterile syringes has now almost equalled the cost of purchase, processing and breakage replacement of glass syringes. The main discrepancy in comparative cost has probably been the price of the larger sizes of plastic syringes. It is interesting to note that some users of plastic syringes have been able to eliminate the use of test tubes for blood samples by keeping the blood withdrawn in the syringe, and sending the syringe to the laboratory.

Plastic syringes by reason of their non-breakability are especially useful for general practice and in medical centres at a distance from the main hospital, with a great saving in transportation costs and breakage rates.

The Cambridge Military Hospital has reduced its Central Sterile Syringe Service work load by the introduction of pre-sterilized (irradiated) dressing packs. Its Central Sterile Supply Service now confines its work to syringe processing, the autoclaving of packs containing laundered linen, receptacles, instruments and gloves. The adoption of disposable syringes would result in a further reduction in the work of the Central Sterile Syringe Service and would improve the service provided.

A NOTE BY THE EDITOR

This subject has been the source of much argument, and, although the principle is sound in theory, there are a number of practical difficulties at present. Unless each syringe is rendered useless after use, people may be tempted to use it again, with the consequent risks of spreading virus hepatitis, etc. It is also difficult to pack in such a way that the syringe is easy to get at while ensuring that there are no risks of the projecting parts, including the needle, piercing the packing. In addition, sterilization has been found difficult, and it is considered that until all syringes can be radiation sterilized perfect sterility cannot be guaranteed.

The Ministry of Health Sterilization Committee and the Pathological Services Committee have this matter constantly under review, but to date no syringe manufactured and packed has been found satisfactory. The Ampin device is scaled in JSCMF and has been found useful for standard drugs in a limited range, but syringes will always be needed for various vaccines and for obtaining specimens of blood, etc., for laboratory investigations. We understand that once a satisfactory disposable syringe is available through the Ministry of Health it will be adopted by the Army Medical Services, and we congratulate Mr. Collantine on his thought provoking article.



MEDICAL STUDENTS' VISIT TO HOSPITALS IN B.A.O.R.

25th July to 3rd August, 1962

Second-Lieutenant C. M. CHABREL

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THE visit was advertised in the medical school in April, and I am submitting a report on it as the only St. Mary's student who went on the visit.

The party consisted of fifteen students, included five dentists, and we came from schools as widely scattered as Cork, Edinburgh and London. Having been sub-divided into three small groups, we visited the following British military hospitals in turn: Munster, Rinteln and Hanover. The three groups met at Hanover and we all went to Berlin together aboard a military train patrolled by armed guards on the journey through East Germany. The ten-day trip, including air travel to and from Germany, was entirely free of charge, apart from the cost of our own drinks and cigarettes, and these were very inexpensive. Transport in Germany was mainly by staff cars and army buses.

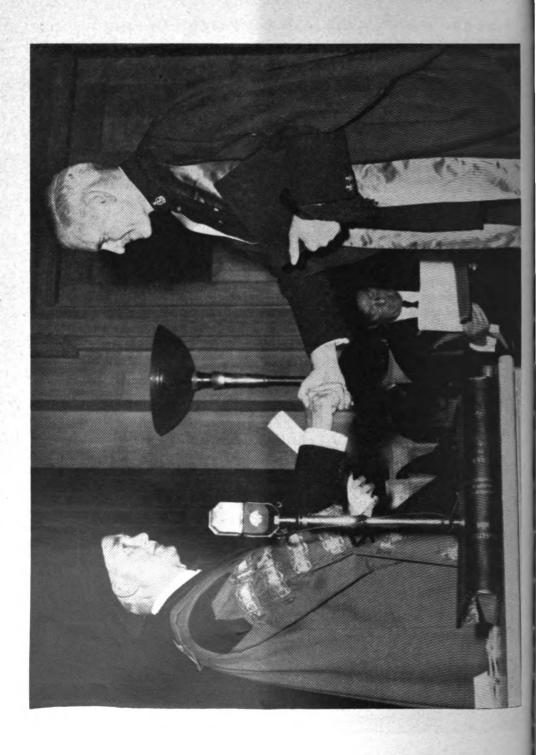
Any ideas that perhaps there was no medicine in the Army were quickly dispelled



on the first day when we were taken on a medical round and were presented with cases of rheumatic fever, thyrotoxicosis, diabetes, measles, pyloric stenosis in the newborn, and a lung abcess that had caused pyopneumothorax. During the course of the tour we saw a very reasonable amount of pædiatrics and obstetrics, and were able to visit the B.A.O.R. Central Pathology Laboratory at Munster. Further, we attended operating sessions at which we were able to assist both in surgical and anæsthetic capacities. The surgery we saw ranged from burns to an R.S.M.'s bunion, and was a great deal more general than that seen on any specialized teaching hospital unit. In addition to the hospital side of Army medicine we also visited the general practitioners or regimental medical officers at their medical centres, and whilst at Hanover were shown over the field ambulance unit which moved into Belsen at the end of the war. The site of the concentration camp, which we visited, is now laid out as a memorial.

The main aim of the visit was to give us an idea of the work done by the R.A.M.C., and this objective was excellently achieved as I hope I have indicated above. However, our social life was not neglected, and we were able to attend cocktail parties, mess dinners, and night-clubs. Munster has a large medical school where we found the students to be most hospitable! Over the weekend various members of the party swam, played tennis or went canoeing. We also found the B.A.O.R. billiard tables to be of a very high standard. Throughout the tour there was ample time to do whatever local sightseeing we wished. As the Berlin Hospital is a small one, much of our visit there was spent seeing the city, and a very full day's tour included a visit to the East Sector with a very knowledgeable Royal Army Education Corps N.C.O. as a guide. Certain members of the party then spent until 6 a.m. inspecting some aspects of West Berlin's night-life.

The ten-day tour was a fascinating holiday at the War Department's expense, and also proved a very interesting experience from the medical viewpoint. The "before and after" change in attitude of some of the party towards the R.A.M.C. was remarkable. I know of four who have already applied for medical cadetships, their decisions being made as a result of, or at least reinforced by, what they had seen. Others were much more interested than when they began the tour. It is, after all, only by seeing a way of life that one can really know whether one wants to take part in it. The frank discussions we had with the serving officers in the R.A.M.C., including the "disgruntled National Servicemen," were invaluable.



"AD EUNDEM"

An extraordinary meeting of the Council of the Royal College of Surgeons of England was held on Wednesday, 13th June, for the admission of new Fellows of the College.

The Council, led by the President, Sir Arthur Porritt, K.C.M.G., K.C.V.O., C.B.E., and preceded by the Macebearer, took their seats on the dais in the Edward Lumley Hall before a large audience of friends and relatives of the Fellows, and, after a felicitous speech of welcome to the company, the President called on Sir Stanford Cade, C.B.E., C.B., who presented Lord Evans for admission to the Honorary Fellowship.

After Lord Evans had replied, Professor Pietro Valdoni of Rome and Professor Eerland of Groningen were also admitted as Honorary Fellows, and Sir Ernest Bradfield, Dr. G. Wells-Cole, Dr. R. B. Sutcliffe, Professor N. Sutton and Professor D. Slome were admitted to the Fellowship as distinguished practitioners of twenty years standing. Then Lieutenant-Colonel J. M. Matheson, O.B.E., F.R.C.S.(Edin.), M.R.C.P., was admitted to the Fellowship (ad eundem), and the President said:

"Colonel Matheson, you will know as well as I that an ad eundem Fellowship is given very rarely in this College, and we give it to people whom we respect and whose work we admire, and this is certainly so in your case. For many years we have heard of your excellent work, from your war service in the desert and onwards. We know you have been largely responsible for the central supply system in the Army and have been greatly interested in gamma radiation of dressings. I think I am right in saying that for a number of years you were liaison officer with the medical department of the American Army, and in this college we like our liaison with the American College, the American people and American surgery. In that we hope and trust we have done you a certain amount of good today by recalling you from Cyprus for this ceremony, and we do welcome you most heartily as a Fellow ad eundem."

After a response on behalf of the newly-admitted fellows by Sir Ernest Bradfield, diplomata were presented to those who had been successful candidates in the recent examinations, the candidates forming thirty-one processions, grouped according to their university or medical school, each procession led by, and presented by a distinguished Fellow; for instance, the candidates from the Universities of Scotland and Ireland being presented by the late Professor Ian Aird, himself a Fellow ad eundem. Finally, Lord Evans addressed the new diplomates, and, after a vote of thanks by the senior Vice-President, the President declared the meeting closed, and led the Council out in procession.

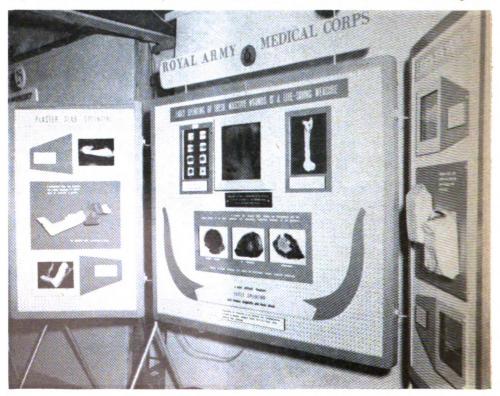
The Charter of the Royal College of Surgeons in 1852 allowed for the admission of Fellows of the Royal College of Surgeons of Ireland and Edinburgh, and of the Royal Faculty of Physicians and Surgeons of Glasgow to be elected Fellows "ad eundem gradem," that is to say, in equal status, but this fell into desuetude until, with the post-war revitalization of the Royal College of Surgeons, and its more active role in the advancement of surgery throughout the world, led to the revival of "ad eundem" Fellowships, and, at the same time, the provision was extended to cover the Royal Australian College of Surgeons and the Royal College of Physicians and Surgeons of Canada.

THE 130TH ANNUAL MEETING OF THE BRITISH MEDICAL ASSOCIATION

THE 130th Annual Meeting of the British Medical Association was held in Belfast, and the Royal Army Medical Corps was one of the 29 exhibitors in the Scientific Exhibition which was open from 23rd to 27th July.

The centre-piece of the R.A.M.C. stand was an illuminated microsecond radiograph showing the effects produced in the thigh of an anæsthetized sheep shortly after penetration by a service rifle bullet, namely a large temporary cavity in the muscles and secondary fracture of the femur by blast effect. To illustrate further the temporary cavitation phenomenon, a series of microsecond radiographs of a gelatin block after penetration by a carbine bullet was displayed. Also shown was a photograph of a reconstructed sheep's femur which had been grossly comminuted during life by the temporary cavitation effects mentioned above.

In a muscle wound the temporary cavity produces a variable area of blood extravasation and ischæmia around the macerated tissues in the track of the missile. A technique has been developed by Colonel J. C. Watts and Captain D. A. W. Hopkinson, R.A.M.C., for showing the extent of this area in experimental wounds by perfusion of the limb vessels with Indian ink. Colour photographs were shown of sheep quadriceps femoris muscle slices perfused in this manner immediately after wounding, and



also five days after wounding by which time a clostridial infection had become established; a perfused normal muscle slice was displayed for comparison.

The two side panels displayed the technique of plaster of paris splinting in first aid, using the new standard plaster slabs in polythene bags which have been developed by the R.A.M.C. in conjunction with T. J. Smith and Nephew. One panel held samples of the slabs and showed photographs of their application to the fractures below the knee, and the other panel had photographs of their uses on fractures of the upper limbs, and also a plaster splint made from the slabs. The exhibit created a great deal of interest and was well received although we were not successful in obtaining the prize for best exhibit. This went to the demonstration of the Stien Leventhal Syndrome shown by Doctors Chamberlain and Wood from the Chelsea Hospital for Women. Nevertheless, it is felt that the effort was well worth while in that it disseminated knowledge of the severity of both soft tissue and muscle injury in bullet wounds and publicized a new and more satisfactory method of emergency splinting.

The assistance given by Dr. Dzemian, U.S. Army Medical Center, Maryland, and by Colonel R. G. Ollerenshaw, of the Department of Medical Illustration, University of Manchester, in producing this exhibit, is gratefully acknowledged. J. C. WATTS

ACADEMIC ACHIEVEMENTS

M.Sc.(London). Radiation Biology and Radiation Physics.

Colonel R. P. LEAKE, E.R.D., M.D., B.S., M.R.C.P.(Edin.), F.R.C.S.(Edin.); Colonel M. M. LEWIS, M.D., Ch.B., D.P.H., D.T.M. & H., D.I.H.; Lieutenant-Colonel T. J. RYAN, M.R.C.P.I., M.R.C.S., L.R.C.P.; Major D. KELLEHER, M.B., B.Ch., B.A.O., M.R.C.P.(Edin.), M.R.C.P., D.T.M. & H.; Major J. BARNES, M.B., B.S., M.R.C.S., L.R.C.P., D.P.H., D.T.M. & H.; Major J. GATT, M.D., M.R.C.P.(Edin.), D.T.M. & H.

F.R.C.S.(Eng.) Captain G. BROCKLEHURST, M.B., B.Chir.

F.F.A.R.C.S.(Eng.) Major R. WILSON, L.R.C.P., L.R.C.S.(Edin.), L.R.F.P.S. (Glas.); Captain D. I. McNAIR, M.B., B.S.

D.P.H.(London) Major W. M. CORNELIUS, L.M.S.S.A., D.T.M. & H.; Major D. M. McFERRAN, M.B., B.S., D.T.M. & H.

D.P.M.(Eng.)

Major R. A. MILLER, M.B., B.S., M.R.C.P.(Edin.), M.R.C.P., F.R.F.P.S.(Glas.), D.T.M. & H.; Captain J. S. GRIMSHAW, M.B., B.S., M.R.C.S., L.R.C.P.; Captain R. J. WAWMAN, M.B., Ch.B.

D.T.M. & H.(Eng.) Major T. S. HART, M.B., B.S., M.R.C.S., L.R.C.P.; Major G.C. WILSON, M.B., Ch.B.; Major T. B. STEPHENS, M.B., Ch.B., B.Sc.; Major J. W. PARSONS, L.R.C.P., L.R.C.S.(Edin.), L.R.F.P.S.(Glas.); Major J. EDGINGTON, M.B., Ch.B.; Major W. J. LAWRENCE, M.R.C.S., L.R.C.P.; Captain J. CARSON, M.B., Ch.B.; Captain B. J. PORTER, M.B., Ch.B.

EXPLORATION MEDICINE

WHILE this issue of our JOURNAL is in press, a symposium on the health and medical problems of expeditions and travellers will be held at the Royal Army Medical College, Millbank, London (25th and 26th October, 1962). This symposium has been sponsored by the Royal Geographical Society, the Medical Research Council and the Directors-General of the Medical Services of the Royal Navy, the Army, and the Royal Air Force. The object of this gathering is to help leaders and organizers of expeditions and exploration societies in their preparations for the maintenance of the health and morale of their parties in any climate and in every part of the world. The problems of "exploration medicine" have long been of particular interest to the Medical Services of the Forces, and the sponsors could not have chosen a more suitable locale in which to hold the conference. The subjects to be discussed range from the psychological aspects of personnel selection to cardio-pulmonary rescusitation; medical and surgical emergencies; medical kits and supplies; and the complex problems deriving from acclimatization, survival and disease prevention under extremes of climate and altitude. The President of the Royal Geographical Society, Sir Raymond Priestley, will deliver the Opening Address. Amongst other contributors and participants, there will be Sir John Hunt and Sir Vivian Fuchs, each of whom is a Vice-President of the Society, and Wilfred Thesiger, the Arabian traveller.

The programme and list of contributors is given below, and a report on the proceedings will appear in our next issue.

PROGRAMME

25th October, 1962

10.10 a.m. Opening Address. Sir Raymond Priestley (President R.G.S.).

Chairman—Surgeon Vice-Admiral Sir ROBERT PANCKRIDGE

11.00 a.m.

Man's limitations in hot climates. Dr. C. S. Leithead.

12.00 noon

Explanation of demonstrations.

12.30-2.30 p.m.

Fixed demonstrations on view.

2.00 p.m.

First-aid application of splints. (Demonstration). Major K. C. Greenwood.

2.30 p.m.

Cardio-pulmonary resuscitation (Demonstration). Colonel K. F. Stephens.

Chairman—Air Marshal Sir PATRICK LEE-POTTER

2.45 p.m.

- (a) Some effects of a wet-cold environment. Lieutenant-Colonel J. M. Adam.
- (b) Medical aspects of Polar exploration. Dr. R. Goldsmith.

3.45 p.m.

Problems of high altitudes.

- (a) Acclimatization and protection. Dr. L. G. C. E. Pugh.
- (b) Medical hazards. Mr. M. P. Ward.

4.15 p.m.

Demonstrations.

- 1. Medical supplies. Colonel R. P. Leake.
- 2. Food for travel. Dr. H. E. Lewis and Mr. A. de Jong.
- 3. Prevision and prevention. Lieutenant-Colonel H. G. Skinner.
- 4. Insects of medical importance. Mr. J. H. Grundy.
- 5. Anæsthetic apparatus. Dr. J. F. Nunn.
- 6. Protection by vaccination. Major P. D. Meers.

26th October, 1962

Chairman-Major-General W. R. M. DREW

10.15 a.m. Problems of survival. Wing-Commander P. D. V. G. Whittingham.

10.45 a.m. Care of the injured. Colonel J. C. Watts.
11.15 a.m. Prevention of disease. Colonel M. M. Lewis.

11.45 a.m. Mental fitness. Colonel H. Pozner.

12.15 p.m. Demonstrations.

Chairman—Colonel R. A. SMART

2.30 p.m. Medical emergencies. Brigadier R. J. G. Morrison.

3.00 p.m. Dental emergencies. Brigadier D. V. Taylor.

Selection and training. Sir John Hunt.

Chairman—Sir VIVIAN FUCHS

4.30 p.m.

3.30 p.m.

Brain's Trust

Lieutenant-Colonel J. P. Baird Surgeon-Captain F. W. Baskerville Dr. C. S. Leithead

Sir Raymond Priestley

Wing-Commander P. D. G. V. Whittingham

CONTRIBUTORS

ADAM, Lieutenant-Colonel J. M., M.B., B.Sc., R.A.M.C., Army Operational Research Establishment. BAIRD, Lieutenant-Colonel J. P., M.D., F.R.C.P.(Edin.), R.A.M.C., Assistant Professor of Military Medicine.

BASKERVILLE, Surgeon-Captain F. W., C.B.E., R.N., Medical Department of the Navy, Admiralty. DE JONG, A. B. E., Development Physicist, Horlicks, Ltd.

Drew, Major-General W. R. M., C.B., C.B.E., Q.H.P., F.R.C.P., Commandant, Royal Army Medical College.

Fuchs, Sir Vivian, M.A., Ph.D., Director, British Antarctic Survey.

GOLDSMITH, R., B.A., M.B., National Institute for Medical Research.

GREENWOOD, Major K. C., M.B., R.A.M.C., Field Training Centre, R.A.M.C.

GRUNDY, J. H., F.R.E.S., F.R.S.A., Royal Army Medical College.

HUNT, Sir John, C.B.E., D.S.O., Director, Duke of Edinburgh's Award Scheme.

LEAKE, Colonel R. P., E.R.D., M.D., M.Sc., F.R.C.S.(Edin.), Assistant Director-General, War Office.

LEE-POTTER, Air-Marshal Sir Patrick, K.B.E., M.D., D.P.H., D.T.M. & H., R.A.F. (Retired).

LEITHEAD, C. S., M.B., D.T.M., School of Tropical Medicine, Liverpool.

Lewis, H. E., M.B., B.Sc., National Institute for Medical Research.

LEWIS, Colonel M. M., M.D., M.Sc., D.P.H., D.I.H., D.T.M. & H., Professor of Army Health.

MEERS, Major P. D., M.D., Dip. Bact., R.A.M.C., Royal Army Medical College.

MORRISON, Brigadier R. J. G., C.B.E., Q.H.P., M.D., F.R.C.P., Professor of Military Medicine.

NUNN, J. F., Ph.D., M.B., F.F.A.R.C.S., Royal College of Surgeons.

PANCKRIDGE, Surgeon Vice-Admiral Sir Robert, K.B.E., C.B., Q.H.P., R.N., Medical Director-General, Admiralty.

POZNER, Colonel H., M.C., M.R.C.S., D.P.M., Command Psychiatrist.

PRIESTLEY, Sir Raymond, M.C., M.A., D.Sc., LL.D., President, Royal Geographical Society.

Pugh, L. G. C. E., M.A., B.M., National Institute for Medical Research.

SKINNER, Lieutenant-Colonel H. G., M.B., Ch.B., D.P.H., D.T.M. & H., Assistant Professor of Army Health.

SMART, Colonel R. A., C.B.E., M.B., D.P.H., Liaison Officer, S.H.A.P.E., Paris.

STEPHENS, Colonel K. F., O.B.E., M.B., F.F.A.R.C.S., War Office Adviser in Anæsthetics.

TAYLOR, Brigadier D. V., Q.H.D.S., F.D.S., R.C.S., Consulting Dental Surgeon to the Army.

WARD, M. P., B.A., M.B., F.R.C.S., The London Hospital.

WATTS, Colonel J. C., O.B.E., M.C., F.R.C.S., Professor of Military Surgery.

WHITTINGHAM, Wing-Commander P. D. G. V., O.B.E., M.D., R.A.F., Institute of Aviation Medicine.



ROYAL INSTITUTE OF PUBLIC HEALTH AND HYGIENE

Public Health Conference, Eastbourne, 11th-12th October, 1962

THE subject of this well-attended conference was *The Hazards of Life*, and although the various speakers had civilian populations in mind a great deal of what they said was relevant to the practice of medicine in military communities.

Hazards from Food

Professor A. C. FRASER, D.Sc., M.D., Ph.D., F.R.C.P., discussed the potential hazards of additives and antibiotics in food, and explained that these might alter the nutritional value of food, cause tissue damage due to toxicity, produce sensitization or give rise to anti-metabolites. This is a subject which is a direct concern to all who have responsibilities for the soldier's food, and anything which can be done to build up knowledge about the effects of additives and antibiotics in relation to their use in food will materially contribute to the efficacy of the safeguard which all reasonable people demand against the hazards of life that inevitably accompany progress.

Professor J. YUDKIN, B.Sc., M.A., Ph.D., M.D., M.R.C.P., F.R.I.C., spoke on the subject of diet. He discussed the important factor of palatability which is a guide to nutritional desirability in natural foods. But a comparatively new hazard has arisen in that the food manufacturer can, and does, separate palatability from nutritional desirability, with the result that those who eat only that which looks nice, tastes nice and has a pleasant texture are at risk to consuming an unbalanced ration. Fortunately the soldier in barracks is nutritionally safe because of his carefully devised ration scale, but there appears to be an increasing need for educating those who live in quarters regarding the basis of good nutrition.

Professor R. E. O. WILLIAMS, M.D., M.R.C.P., spoke on the bacteriological hazards from food, and drew attention to the fact that published statistics of food-poisoning over the last 10 to 15 years have shown a considerable increase in the number of cases reported. Having discussed food-poisoning and the commoner gastre-intestinal diseases such as dysentery, Professor Williams reminded the Conference concerning *Brucella abortus*, *Rickettsia burneti*, poliomyelitis and the virus diarrhæss. Military populations are particularly at risk to food-borne infections because of communal living and feeding, overseas residence and field-service conditions, and the relevant hygiene measures are closely linked with good military administration and leadership.

Hazards at Work

Professor Sir Brian WINDEYER, M.B., F.R.C.S., F.R.C.P., D.M.R.E., F.F.R. discussed the protection of those who are occupationally exposed to ionizing radiations and drew attention to relevant legislation. This is a subject which demands the attention of all who are concerned with the health of the soldier, although care must be taken not to over-emphasize radiation hazards at the expense of other more common preventable causes of ill health. In the Army, these hazards in peacetime are limited

to the medical and dental use of radiations, luminizing procedures in workshops, the storage, transportation and use of luminized equipment and radioactive training aids, and the associated repair services. Therefore the radiation hazard to the soldier in peace is comparatively minor at present and it must be ensured that this is always so.

A. R. THOMPSON, M.D., D.P.H., D.I.H., spoke on "job assessment" and, in discussing the problems of fitting the job to the man, he mentioned group interview techniques, quoting War Office Selection Boards as an example, and the PULHEEMS system of functional assessment which has been adapted to meet the needs of industry. Dr. Thompson explained that, in recent years, research into human performance and the relationship between man and his working environment has produced a composite science under the name of *ergonomics* which enlists the help of the anthropologist, the physiologist, the psychologist and the engineer in the matching of a mechanical system to human performance. The increasing complexity of modern military equipment makes ergonomics a science which has much to offer those who are concerned with the health and efficiency of the soldier and, already, its principles are being actively applied in the Army.

Charles B. HOWLAND, Esq., explained the benefits of automation and discussed some of the fears and anxieites, such as those concerned with redundancy, which are associated with it. Although automation reduces the need for manpower in industry its application to the requirements of the Army seems likely to result in increased efficiency and an easing of manpower problems without redundancy.

Hazards in the Home

J. H. SHELDON, C.B.E., M.D., F.R.C.P., stressed that home accidents show a bimodal distribution, with a maximum incidence in children and old people; in fact, 65 per cent of accidents in the home involve persons over 65 years of age. Although the Army has no geriatric problems, it is much concerned with the health of the wives and children in its community, and the need to minimize the likelihood of accidents must always be borne in mind when married quarters are being designed and equipped.

Kenneth J. CAMPBELL, A.R.I.B.A., spoke of design in the home with particular reference to accident prevention, and stressed the need for intelligent forethought regarding design to protect harassed housewives and inexperienced children in their moments of thoughtlessness. He emphasized the dangers of bad lighting, unguarded fires, dangerous stairways and balconies, polished floors, gas and electricity. Mr. Campbell made a plea for the provision of adequate numbers of electric socket outlets, and for safety sockets and fused plugs; an insufficient number of sockets tempts occupiers to install long leads and to make dangerous improvisations.

John R. REES, M.D., F.R.C.P., D.P.H., discussed the emotional climate in the home and referred particularly to results of the deprivation of maternal care. The mental health of the soldier and of his family has preoccupied many military medical officers in the past and continues to do so today. The particular circumstances of military life, with its changes of environment, separation from time to time, and communal living conditions bring with them emotional stresses which have to be offset by arrangements which cater for the needs of the soldier's family with generosity and insight.



Hazards during Travel

- J. P. BULL, M.A., M.D., drew attention to a striking change in the role of accidents as a problem of public health in the U.K. In 1946, infectious diseases caused twice the number of deaths (28,000) as all accidents (14,000). By 1960, total accidental deaths had risen to about 18,000 and deaths from infectious diseases had fallen to 5,500. Road accidents alone, now approximately 7,000 per year, constitute a more important epidemic than all infectious diseases put together. It has also been noted in the Army that accidental injuries constitute a most important cause of military manpower wastage, and this becomes increasingly obvious as wastage from the majority of other causes decline.
- L. G. NORMAN, M.D., F.R.C.P., D.P.H., discussed driving and medical fitness, and emphasized that it has become a duty of medical practitioners to do all they can to ensure that their patients are safe as drivers, both from the point of view of their medical condition and because of the effects of any drugs that may be prescribed. In discussing the importance of certain medical conditions in relation to safe driving he mentioned cardiovascular disease, epilepsy, diabetes mellitus, impairment of hearing and defective vision. This subject is of obvious importance in the military community, and Dr. Norman's book on the epidemiology, prevention and control of traffic accidents is extremely useful (see Book Review section).

 M.M.L.

COLONEL FRANCIS STEPHEN IRVINE

C.M.G., D.S.O., M.B., B.Ch.



Francis Stephen Irvine died in the Queen Alexandra Military Hospital, Millbank, at the age of 88 years, on 3rd July, 1962, after a long period of ill health against which he had fought with courage and cheerfulness.

He was born on 26th December, 1873, the seventh son of the late Canon Richard Irvine, D.D., of Belfast. He graduated in medicine at Queen's University, Belfast, in 1899 and joined the R.A.M.C. in the same year. He was on active service in South Africa within a few months of receiving his commission, and with the 10th Brigade Field Hospital and the Somerset Light Infantry he took part in the battle of Spion Kop and the Relief of Ladysmith.

In the 1914-18 war he remained behind to care for the wounded during the retreat from Mons, and was taken prisoner. He escaped and was back with his unit within a few weeks, but was later severely wounded at Ypres.² He won the D.S.O. in 1915 and was appointed C.M.G. in 1918. His peacetime appointments included Adjutant to the Transvaal Medical Corps, Adjutant of the R.A.M.C. Depot, Assistant Commandant of the Royal Army Medical College, O.C. Surgical Division, O.C. Cambridge Military Hospital, A.D.M.S. London District and D.D.M.S. Northern Command. In addition, he served two tours in India. He retired after 31 years distinguished service in 1930.

In 1939, at the age of 66, he again offered his services and was appointed Assistant Commandant of the Royal Army Medical College, an appointment he had held 28 years previously. In June, 1940, he was appointed Commandant, and was subsequently promoted to the rank of acting Major-General. He remained in residence at the College until the war was over and, during that time, 23 bombs fell within 200 yards causing considerable damage. His success in maintaining the morale and efficiency of the College during those difficult years had important implications, because the ability of the Army Medical Services to meet its wartime commitments was influenced profoundly by medical officers trained under his direction. He finally retired in 1946 at the age of 73 but, unfortunately, he had not held the rank of Major-General long enough to retain it on retirement.

During the final retirement he maintained a keen interest in the activities of his Corps, and his regular attendance at meetings of the R.A.M.C. General Funds

¹Brit. Med. J. (1962).

²The Times. 12th July, 1962.

Committee, of which he was a member, made a wealth of valuable experience available. Golf was among his many other interests, and he was a keen supporter of the R.A.M.C. Golfing Society whose meetings he continued to attend even when ill health prevented him from playing. The trophy he gave to the Society ("The Irvine Cup") is competed for annually, and on the occasion of its presentation at the R.A.M.C. Golfing Society Autumn Meeting on the 2nd October, 1962, he was fondly remembered by all present.

Colonel Irvine never married, but he had many brothers, sisters, nephews and nieces, all of whom turned to him whenever in doubt or difficulty and rarely failed to profit by his long experience of life and his deep and generous understanding of its difficulties.: He will be remembered by many, for a long time, as a good doctor, an inspiring leader, an understanding and human counsellor, and a valued friend.

A Memorial Service was held in the Queen Alexandra Military Hosptial Chapel. Millbank, on Monday, 30th July, at which a most moving address was given by Lieutenant-General Sir William MacArthur, K.C.B., D.S.O., O.B.E., F.R.C.P., M.D., D.Sc., D.P.H. The Rev. E. S. Michael, R.A.Ch.D., (Chaplain to the Tower of London) officiated, and among those present were: Mrs. K. Le C. Ball and Mrs. R. C. Williams (sisters). Major and Mrs. P. J. S. Ball, Mr. G. N. T. Davenport and Mr. R. B. Ball (nephews). Mrs. H. E. Knott. Major-General J. L. Gordon (representing D.G.A.M.S.). Lieutenant-General Sir William and Lady MacArthur. Lieutenant-General Sir Alexander and Lady Drummond. Major-Generals A. E. Campbell. H. Quinlan, W. R. M. Drew, W. H. Hargreaves, W. D. Hughes and Mrs. Hughes. F. R. H. Mollan, R. E. Barnsley and R. A. Bennett. Brigadiers H. N. Perkins. J. B. George and J. Clynton Reed. Colonels C. V. McNamara and Mrs. McNamara. E. J. S. Bonnett, R. T. Shipman, G. M. Denning, B. Levy, G. T. Gimlett, J. C. Watts and J. A. C. Kidd. Lieutenant-Colonels J. T. Moore and M. M. Lewis.

M.M.L.

IAN AIRD

An Appreciation

In the untimely death of Professor Ian Aird, the Royal Army Medical Corps has lost a loyal and faithful friend, who not only served in the Corps with gallantry and distinction but who, on his return to civil life and pre-eminence in surgery, was always active in support of the Corps. Other abler pens, in the national press and in the medical journals, have described his surgical brilliance, his teaching ability, his drive and enthusiasm, his forthrightness and eloquence, but none will ever be able to do justice to this many sided genius.

The writer first met Ian Aird in December, 1941, at the Surgical Conference in Cairo and sat enthralled as he described his experiences with a field surgical unit. His dramatic account of his unit's capture by Rommel's forces and his obtaining permission to continue operating was made even more vivid by his account of the young gunner subaltern who entered his operating tent unannounced during the night and said "Is this the field ambulance?" Ian Aird's reply that it was the field surgical unit, but "it might interest you to know that you are in the middle of a German Armoured Division" extracted the response—"Oh, I say, how very embarrassing"—followed by the prompt withdrawal of the gunner and his troop undetected by the Germans. After the war Aird retained his contacts with the Corps and for several years a succession of Army surgeons have been attached to the Postgraduate Hospital whilst working for the Final Fellowship examinations, nearly all succeeding in passing at the first attempt; anyone from the Corps attending his popular Friday rounds and clinico-pathological conferences received an almost overwhelmingly hospitable welcome.

Only three days before his death he was an honoured guest at a Regimental Guest Night at Millbank, and it is impossible to believe that this dynamic and lovable figure is no longer with us.

J.C.W.

LETTERS TO THE EDITOR

TREATMENT OF SCHISTOSOMIASIS

From Brigadier A. P. Trimble, C.B.E., M.D., F.R.C.P.(Edin.)

SIR—I should like to confirm Major Moore's experience of the successful use of lucanthone hydrochloride (nilodin) in the treatment of infection with S. hæmatobium:

A few years ago, in Malaya, we treated 175 such cases in African soldiers with a 95 per cent cure rate when examined 3 to 6 months later. The details were published in the Transaction of the Royal Society of Tropical Medicine and Hygiene (1956 50, 597). The dosage was somewhat bigger, being 20 mg. per kg. per day in two dividend doses for 6 days. Toxic effects similar to those found by Major Moore occurred but were very greatly diminished when anthisan (mepyramine maleolate) mg. 100 was given with the drug. This reduced the incidence of moderate to severe reactions from 60 per cent to 15 per cent in 144 patients thus treated. Of these, 103 were treated in unit lines and considered capable of performing light duties.

This has been by no means the universal experience with nilodin, and a longer follow-up than 3 to 6 months is desirable; further trials would appear to be worthwhile. It has two great advantages over other methods of treatment. It is administered orally and, as Major Moore says, "it does not kill."

HEADQUARTERS, B.A.O.R. 4th July, 1962.

I am, etc.,

A. P. TRIMBLE

RECRUITING

From Lieutenant-Colonel S. B. Telford, M.B., D.T.M. & H., R.A.M.C.

SIR—In most of the recent publications directed at the recruitment of medical officers great efforts have been made to stress how very similar service with the R.A.M.C. is to civilian practice. However, many officers joined the Corps because they could not bear the thought of continuing in civilian practice for another day. They joined for reasons which appear now to be discredited. The joy of looking after a healthy community and the prospect of keeping them that way, instead of dealing with a population looking for certificates and barbiturates. The opportunity of being a soldier as well as a doctor and of belonging to a pleasant and exclusive group, beside the pleasure of overseas service together with the possibility of commanding men Administrative and staff appointments were viewed as part of one's military training and not as a hazard to continued professional ability.

The new terms of service emphasize almost entirely the opportunities for higher qualifications, hospital and ancillary facilities, rank unrelated to prowess, higher pay and special privileges for quarters. Now also I see that the promotion exam has been abolished. The purpose, surely, of the Army Medical Services in peacetime must be to produce a nucleus, or cadre, of officers and men who are not only professionally

J. roy. Army med. Cps. (1962). 108, 130.

competent but highly trained in field and staff duties, around whom the Corps can expand in time of emergency. To achieve this, career planning must be such that all officers carry out these duties at various stages during their service. In an almost apologetic paragraph in the new pamphlet A Career for Doctors in the Royal Army Medical Corps it is mentioned that there is scope for field and staff duties "for officers whose interests lie in this direction." I wonder if it is not probable that in emphasizing the many points of similarity between service and civilian practice we may fail to attract into the Army the type of doctor who is looking for a complete change of environment with scope for practising medicine in a stimulating community.

The requirements of the R.A.M.C. must surely be to provide a cadre of medical officers who are professionally competent and up to date, experienced in field work and with a sound knowledge of staff duties. I suggest that only if we succeed in this will we have honoured our terms of reference, as a Corps in the British Army.

10 BRIGADE GROUP MEDICAL COMPANY, BRITISH FORCES POST OFFICE 69. 28th August, 1962. I am, Sir, etc., S. B. TELFORD

TRAINING FOR SPECIALISTS

SIR—Were I a Latin scholar, instead of using the expression "endeavouring to fight the wrong battle successfully on ground of his own choosing," I might have said that there had been committed an "ignoratio clenchi," i.e. an ancient device in controversy which may be defined as "argument that appears to refute opponent while actually destroying something not advanced by him." 123

As regards recruitment of consultants ready-made for the Army,⁴ it is understood that it is now policy for army G.P.s to be employed, where possible, on an area basis rather than as R.M.O. Furthermore it is generally accepted that it now takes seven years to make a doctor and ten years to make a G.P. Also in these modern days, that potential consultants should start to climb the ladder of consultant training once they have gained their minimum medical qualifications to practice. The suggestion made by Robert MacFarlane that a civilian consultant would have to spend three years as an R.M.O. or equivalent at home or overseas otherwise he would be "unqualified to be an army consultant" must make interesting reading to the doctors called up for service in World War II and who served as army consultants. Let us get down to realities and accept that a good doctor makes a good medical officer while a competent civilian consultant recruited into the R.A.M.C. quickly absorbs the army atmosphere. All that is required to take the army in one's stride is common sense.

I congratulate you, Sir, on your leading article.⁵ Popular misconceptions about



¹Watts, J. C. (1962). J. roy. Army med. Cps., 108, 142.

²Manu Forti (1962). *ibid.*, 143.

³PLATT, SIR R. (1962). Lancet, 1, 1349.

⁴MACFARLANE, R. G. (1962). J. roy. Army med. Cps., 108, 143.

⁵Leading Article (1962). ibid., 101.

our Corps are due essentially to lack or publicity regarding the achievements of regular officers and to our unfortunate habit (as a Corps) of hiding our light under a bushel. Perhaps there could be more encouragement to air views individually and not just through usual channels. Officers of all ranks could be encouraged to read ten-minute papers at Annual Study Periods. Names of officers to speak would be drawn out of a hat.

It has been suggested that in these modern days there is not nearly enough voicing of honest opinion as the following extract from the Daily Mail (May, 1962) would indicate: "The honest expression of opinion should be encouraged in every walk of life. It is a sign of integrity of purpose. That is what is lacking today. There was a time when Britain was full of men who said what was in their hearts. Their outpourings were heated, but they cleared the air. Today a man has to force himself to be outspoken enough to say that his pint of beer is off. It isn't simply the ability to be rude. Anyone can have that. It is something we all seem to have lost: the ability to give an honest point of view. Churchill sensed this was coming when he said: 'Men occasionally stumble over the truth, but most of them pick themselves up and hurry off as if nothing had happened.' Everywhere, every day, we stumble over the truth. And most of us, afraid to open our mouths, pass politely on."

Criticism is the spice of life. Without it there is no freedom and no progress. Let us not stand still or look backwards through rose-coloured spectacles to the good (or bad) old days. Instead let us have our feet on the ground and look forward to the future over the horizon of tomorrow with the wind of change in our backs.

I am, etc.,
MANU FORTI

From Captain P. G. A. Bloomer, R.A.M.C.

SIR—I feel I must challenge the ideas expressed in Lieutenant-Colonel MacFarlane's letter.¹ As I understand it, he suggests that a "ready made "civilian consultant would not be able or competent to practice military medicine without the experience of three years as a regimental medical officer.

The implication is that there is something particularly subtle about the practice of medicine in the Army which distinguishes it from that in civilian life, and this I find hard to accept. Admittedly, servicemen and their dependents have certain special problems, but I would not have thought it requires three years of R.M.O. duties in order to appreciate them.

Perhaps somebody can convince me that I am wrong, but in my view this is a long-standing myth of the R.A.M.C. which should long ago have been debunked.

BRITISH MILITARY HOSPITAL,
DHEKELIA,
BRITISH FORCES POST OFFICE 53.
19th July, 1962.

I am, Sir, etc.,

P. G. A. BLOOMER

¹J. roy. Army med. Cps. (1962). 108, 143.

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From Captain J. N. G. Evans, M.B., B.S., D.L.O., R.A.M.C.

IR—With reference to the letter from Lieutenant-Colonel MacFarlane. I fail to inderstand why "military medicine" is so far divorced from medicine as a whole hat it requires three years as a regimental medical officer to become a proficient "army consultant." Surely anyone with a higher registrable qualification and who has undergone a period of training with adequate clinical material may, if he is sufficiently competent, become a consultant. It is then but a short step to realize that a fighting coldier must be fully fit in all respects. Any minor disability can then be assessed in accordance with the PULHEEMS pamphlet.

Not only is it unnecessary to be employed as a regimental medical officer for three rears, it is contrary to official policy which suggests that medical officers will normally be employed on an area not a regimental basis. The aura of high priesthood which in some peoples' minds surrounds the R.A.M.C., so much so that army consultant status becomes "a task for which one has been chosen," is the very attitude which irritates the younger medical officers. It typifies the opinions of yesteryear and is the complete antithesis of the views of the modern generation.

MILITARY HOSPITAL,
DELHI BARRACKS,
TIDWORTH, HANTS.
28th June, 1962.

I am, Sir, your obedient servant, J. N. G. EVANS

THE MYSTERY OF THE HOTTENTOT VENUS

From Colonel T. A. Pace, O.B.E., M.D., B.Sc., D.P.H.

Sir—How sad, alas! to read of the disappearance of the Hottentot Venus (*J. roy. Army med. Cps.*, Vol. 108, No. 3, page 141). But could it be that Sir Thomas Longmore, with wonderful foresight, was hinting at a possible clue when he referred to the move to Thames Bank?

Has anybody thought of looking inside the Himalayan Bear which stands and waits in the Entrance Hall of the R.A.M.C. Headquarters Mess?

HEADQUARTERS
54 (EAST ANGLIAN) DIVISION/DISTRICT,
COLCHESTER.
2nd July, 1962.

I am, Sir, your obedient servant, T. A. PACE

From Major-General R. E. Barnsley, C.B., M.C. (Retired)

Sir—Since the publication of your note on "The Hottentot Venus" (J. roy Army med. Cps., Vol. 108, No. 3, page 141), further information has been received from Mr. Longmore, who writes as follows: "I have a note telling me that the 'Hottentot' lady is in Paris on permanent exhibition at the Musee de l'homme." I don't know of

¹J. roy. Army med. Cps. (1962). 108, 143.

such a place, but I think the information is correct and wonder how she got them from Netley and if it is the same "Venus."

Perhaps one of your readers, residing in Paris, may know something of this museum, and is it too much to hope that one day, after many wanderings, the lady may find a home in our own museum?

HON. SECRETARY AND CURATOR,
R.A.M.C. HISTORICAL MUSEUM,
QUEEN ELIZABETH BARRACKS,
CROOKHAM, HANTS.
22nd August, 1962.

I am, Sir,
Yours faithfully,
R. E. BARNSLEY

VIROLOGICAL DIAGNOSIS

From Major P. D. Meers, M.D., Dip.Bact., R.A.M.C.

SIR—Lieutenant-Colonel H. Foster's paper¹ on Tropical Medicine in Cyprus demonstrates to what extent rickettsial and viral studies may help in clarifying the diagnosis in some cases of the short-term fevers. To many the exact diagnosis of these conditions so prevalent in tropical and sub-tropical areas, may appear academic—and so it is to the original sufferer. The epidemiological knowledge brought to light by such studies is of great potential importance, however, as without such knowledge. preventive measures cannot be planned.

One point needs to be stressed. In the investigation of any outbreak of an apparently infectious disease, the most strenuous measures should be taken to isolate an infective agent, as serological diagnosis is always a very poor second best to the isolation of the causative organism. The extent of an incident may very well be defined serologically; a precise diagnosis on which to base anything but somewhat circumstantial epidemiological information must await isolation and identification of the causative agent.

ROYAL ARMY MEDICAL COLLEGE, MILLBANK LONDON, S.W.1. 22nd June, 1962. I am, etc., P. D. MEERS

¹Foster, H. (1961). J. roy. Army med. Cps., 108, 77-80.

BOOK REVIEWS

Fundamental Techniques of Plastic Surgery and Their Surgical Applications. IAN A. McGregor. 2nd Edition. Edinburgh and London: E. & S. Livingstone Ltd., 1962. Pp. 286. Illustrated. 32s. 6d.

The fact that a second edition of this book has appeared only two years after the first stresses the excellence of this handy little volume, and the way in which it so neatly fills a gap in the knowledge of most general surgeons. The original value of this work has been enhanced by the addition of chapters on maxillo-facial injuries. The rapid development of plastic surgery during and after the last war has resulted in its achieving an air of "mystique" which Mr. McGregor's book will do much to dispel, and there is no doubt that every surgeon would benefit greatly from reading this book. The approach to nearly all the elective fields of surgery must be through the skin and, although this is a long-suffering tissue and shows remarkable vitality and resistance to insult, nevertheless it repays a thousandfold careful and meticulous handling.

Mr. McGregor's book is divided into two parts; the first covering basic techniques in plastic surgery, and the second their application to general surgery, orthopædic surgery, hand surgery, and surgery of the eye-lids. There is no attempt to discuss specialized plastic surgical procedures and, perhaps unfortunately from the point of view of discussion between plastic surgeons and general surgeons, Mr. McGregor scrupulously avoids eponyms, but the adequate bibliography at the end of each chapter makes it easy for readers stimulated by this brilliant book to delve more deeply into this

subject.

The writing is excellent, the illustrations clear, the format well up to the high standard of the publisher, and the price is reasonable. It is difficult to find a book which would be more valuable to the general surgeon and especially to the accident surgeon. This book should be in the hands of every military surgeon.

J. C. WATTS

Connective Tissue Massage. MARIA EBNER. London: E. & S. Livingstone Ltd., 1962. Pp. viii+416.

The first five chapters of this book provide a useful introduction to the subject by summarizing the arrangement and functions of connective tissues, the skin and circulatory mechanisms. But the following two chapters, which explain the technique and effects of Connective Tissue Massage, are not convincing. Conventional massage has been evaluated by many authorities and in recent years has been the subject of considerable experimental physiology. The attempt to justify this elaborate routine in terms of applied anatomy and physiology has not, in the opinion of the reviewer, succeeded; the technique advocated suggests a too-specialized "laying-on of hands" and makes too much of the possible significance of variations in skin and fascial tension. Therapeutic applications and case notes in the last part of the book attempt to give proof of the efficacy of the method. Without a very large series and adequate controls this "evidence" is of little value and identical results might well be claimed for many other methods of treatment, including conventional massage. In conclusion one wonders, even if the results claimed are justified, whether they could not have been achieved more simply and economically—important factors in these days of over-crowded physiotherapy departments.

A. F. Smith

Typhoid Fever and other Salmonella Infections. R. L. Huckstep. London: E. & S. Livingstone Ltd., 1962. Pp. xvi+334. Illustrated. 42s.

It is perhaps somewhat surprising to encounter a textbook on a medical subject written by a surgeon. This is one. The author has had wide experience of typhoid and other salmonella infections in East Africa. He has personally treated over 1,300 cases of typhoid, largely under primitive conditions, and the fruits of his experience are presented in this readable little book. Of these, 240 patients were admitted to a modern hospital at Nairobi, and subjected to detailed laboratory investigations, thereby constituting a research series.

The book gives a simple and detailed account of all aspects of typhoid in an orderly sequence. It is not intended for the research worker but is eminently suitable for students, general practitioners and particularly for those doctors who have to deal with typhoid in primitive communities. Great stress is laid on the value of the Diazo reaction as a diagnostic aid and, although this test is seldom used in this country, the author advocates its employment most persuasively and has found it particularly helpful in situations where laboratory investigations are impractical. Moreover he presents us with interesting statistics on this test performed upon 638 typhoid patients and 2,115 controls.

Typhoid is no stranger to the Army. It is gratifying to find the experiences of Marmion, in the big epidemic of enteric which occurred in service personnel in the Middle East in 1951, so freely quoted. The illustrations consist of line drawings which pointedly summarize the text and of clinical photographs and X-rays. Although the arrangement has led to considerable repetition, which is at times irritating. Mr. Huckstep has succeeded in writing a simple, practical and comprehensive account of salmonella infections which deserves to be widely read.

R. J. G. MORRISON

Modern Medical Treatment. HENRY MILLER (Editor). Various Authors. London: E. & S. Livingstone Ltd., 1962. Pp. vii + 200. Illustrated. 30s.

This book is intended for general practitioners and for specialists who desire up-to-date knowledge of treatment of general medicine. There are 16 contributors gathered largely from the ranks of the younger consultants practising in the north of England. The book makes no claim to be comprehensive, but Dr. Henry Miller, the editor, has allowed his contributors to wander over a very broad territory. The emphasis has rightly been placed on those treatments which can be given by the family doctor or in a general hospital. The reader in search of highly specialized techniques or reserche methods of treatment will not find them here. An essentially practical outlook has been adopted and the authors have described their own particular methods of dealing with various diseases. Thus the reader is spared descriptions of outmoded methods of treatment and is not subjected to a bewildering choice of therapeutic adventures. The wide selection of subjects will be welcomed by the general practitioner; in addition to the usual symptoms encountered in books on general medicine there are sections on acute poisons, psychiatric disorders and venereal diseases, and there is a long chapter on diseases of the skin. One defect of multiple authorship is the danger of overlap, but with a few exceptions this has been avoided here. Differences in literary style make for unevenness in reading and at times a note of pomposity creeps in; if a disease is incurable it is surely better to say so rather than to state that it is "totally inaccessible to therapeutic intervention." There are a few mistakes. It is a pity that thalidomide is advocated as a sedative. But this is a good book. Every doctor would be the better for reading it and it will surely attain the popularity it deserves. R. J. G. MORRISON

Diabetes Mellitus in the Tropics. J. A. TULLOCH. London: E. & S. Livingstone Ltd., 1962. Pp. 294 37s. 6d.

This book illustrates the many problems of diabetes among the ill educated and poor inhabitants of the tropics, who mostly lack medical supervision; for example, illiteracy may render instruction in, and management of, the disease well nigh impossible. The appendices give useful practical information—specimen diets from all parts of the world with tables of food values and food composition—J. P. Bard

Biochemical Investigations in Diagnosis and Treatment. J. D. N. NABARRO. 3rd Edition. London: H. K. Lewis & Co. I.td., 1962. Pp. 298, 30s.

H. K. Lewis & Co. Ltd., 1962. Pp. 298. 30s.

As expected, this book by Dr. J. D. N. Nabarro is a well co-ordinated, concise and polished work on the biochemical investigations required for the diagnosis and the management of hospital patients. The author, whose objective was to produce a "practical guide rather than a reference book." has succeeded handsomely in preparing a text which is invaluable because it describes the uses as well as the limitations of the various biochemical investigations which are becoming increasingly important in all branches of medicine. This book is well presented and the price of 30s. is extremely reasonable It is warmly recommended to all sections of the medical profession.

J. GAIT

Halothane (Fluothane). C. RONALD STEPHEN and DAVID M. LITTLE, Jnr. London: Baillière, Tindall & Cox, 1962. Pp. 151, 14 Figs. 48s.

There is no doubt that the relatively new anæsthetic drug halothane is being used on an extincreasing world-wide scale by discerning anæsthetists, and the authors of this short monograph have set out to summarize the knowledge and experience gained so far of the properties and clin. a use of this valuable agent.

Their efforts have been notably successful in the first eight chapters, which are confined to at account of the physical, chemical and pharmacological properties of the drug. But when they come to describe its clinical application, their deference to a wide variety of opinion inevitably leads to a somewhat confusing and at times contradictory picture.

Nevertheless this book constitutes a useful, unbiased and remarkably complete account of the accepted role of halothane in anæsthesia today. It is written lucidly, it is excellently produced, and deserves a wide circulation.

Keth F. Stephen

Recent Developments in the Sterilization of Surgical Materials. Report of a Symposium held at the School of Pharmacy, University of London, April 11-13, 1961. London: The Pharmaceutica Press, 1962. Pp. 232. Illustrated. 30s.

The papers in this valuable report deal thoroughly and clearly with the uses of ionizing radiation ethylene oxide and heat, and the surgeon is able to study the advantages or disadvantages of all three methods, together with a wealth of practical detail in their applications. In dealing with radiative sterilization, Dr. Powell embarks on some philosophical theorizing about the impossibility of absolute sterility by all methods, including heat, concepts which seem a little unreal to a biologist who simpelled to ask how many bacteria survive in the steel in a Bessemer furnace. But he descends in practical levels in accepting a risk of 1 in 1010. In Mr. Burnard's clear and informative paper on the design and production or irradiation plants, gamma radiation from cobalt 60 in a properly design plant is accepted as being 100 per cent effective. A stimulating and provocative paper by Dr. Bowere

the control of heat sterilizers rapidly removes any complacency we may have felt at the adequacy of our present sterilizers. As he says "many hospitals are paying dearly to act as unequipped field trial units for 'production models' which are in fact undeveloped prototype sterilizers." It seems clear that, for safety, temperature control must be by pyrometer in the chamber and not a drain thermometer as at present. His tale of the detection of the defect in a sterilizer which was incorrectly coupled to the water supply of the nurses' W.C. so that on flushing, the fall of water reversed all the valves is a Sherlock Holmes' epic in miniature. The discussions, which are reported in full, are most informative, and it is pleasant to see credit being paid to the Army, the Cambridge Hospital in particular, for its pioneer work on Central Sterile Supply. This report emphasizes the horrifying gap which exists between the expert knowledge of a few and its inadequate practical application in routine hospital practices.

J. C. WATTS

Expert Committee on Biological Standardization. (14th Report). W.H.O. Technical Report Series No. 222. World Health Organization, Geneva, 1961. Pp. 56. Available H.M.S.O. 3s. 6d.

This report is one of a series from a Committee set up by the World Health Organization to co-ordinate the establishment of International Standards and Reference Preparations. These are designed to ensure that the potency of antibiotics, hormones, vaccines and antison conform to certain internationally recognized criteria, thus allowing preparations from various sources to be used interchangeably without difficulty.

P. D. MEERS

Expert Committee on Addiction Producing Drugs, (12th Report). World Health Organization Technical Report Series No. 229. World Health Organization, Geneva, 1962. Pp. 28. Available H.M.S.O. 1s. 9d.

This technical report records the opinion of the Committee regarding the addiction liability of certain substances. The Committee notes that the traffic in heroin continues to increase, and that there is a definite trend towards the use of heroin by opium addicts. The Committee also notes the importance of giving complete, correct and early information to the medical profession on the addiction-producing and habit-forming properties of new drugs.

J. McGhie

Road Traffic Accidents. (Epidemiology, Control and Prevention). L. G. NORMAN. W.H.O. Public Health Papers No. 12. World Health Organization, Geneva, 1962. Available H.M.S.O. Pp. 110. 6s. 8d.

Road traffic accidents contribute to the high rate of accidental injuries which is being experienced by the Army of today. The epidemiological factors which lie behind vehicle accidents should receive a much closer study from the Army Medical Services than is the case at present. This excellent survey by Dr. Norman of the London Transport Executive—himself a former Army Health Officer—should serve to point the way. The economic loss due to injuries, particularly in young males up to the age of 30, to which he draws attention applies most particularly to a military population.

The Army with its known age composition, the known establishments of standard vehicles, the system of mileage recording and accident reporting, provides a wealth of data of the type the author stresses as being essential for any programme of accident prevention. Special risk groups, sets of circumstances and types of vehicle are capable of being pin-pointed and appropriate preventive measures evolved. He points out the analogy between host, agent and environment and the road user, the vehicle and the road. While an Army must take the roads as it finds them, it might well take a closer look at vehicle design for built in safety factors as far as the tactical uses permit. The Army gave the lead over the crash helmets for motor cyclists but has lagged behind in respect of safety belts. As regards the user, the Army has the training of the drivers from the beginning. But are the successes and value of the training methods fully evaluated and adjusted accordingly. Dr. Norman points the way to further research in an excellent summary. Much of this is probably already operative in the Army but may require co-ordination if we are to help towards the solution of a public health problem in which a mechanized army inevitably shares but which presents its own particular factors.

This publication is valuable reading for all concerned with the total care of the soldier.

D. G. LEVIS

(We are informed that it is now the policy of the War Office to fit all staff cars and Hillman Husky Utilities with safety harness, and that this is now awaiting financial approval. We are also informed that certain cars have already been fitted, and that the remainder will be equipped as soon as financial approval is received—Editor).

Aspects of Water Pollution Control. W.H.O. Public Health Papers No. 13. World Health Organization, Geneva, 1962. Pp. 115. Available H.M.S.O. 6s. 8d.

This W.H.O. publication is concerned mainly with the international, legal and economic aspects of water pollution. The range of its contributors confirms that the demands for water and the extent of its pollution are not problems exclusive to the U.K. It goes into relatively little technical detail, in the laboratory sense, regarding pollution. It is not for general reading by Health Officers but would be of possible value to those whose professional destinies might lie, at some problematical time in the future, with the Public Health aspects of a Military Government.

D. G. Levis

Planning, Organization and Administration of a National Health Laboratory Service. Third Report of the Expert Committee on Health Laboratory Services. World Health Organization Technical Report Series No. 236, 1962. Pp. 46. Available H.M.S.O. 1s. 9d.

One of the essential aims of public health in the developing countries should be the co-ordination of all types of laboratories at different levels into a single national health laboratory service that would form an integral part of the national health service. The report opens with a description of the experience of developed countries in establishing a network of health laboratory services, and then defines the scope and functions of such services—microbiological, entomological, hæmatological pharmaceutical and epidemiological, among others. This is followed by a full exposition of the many factors involved in the planning, organization, and administration of a national health laboratory service in the context of long-term development programmes and in relation to the needs, health problems and resources of the country concerned. Students of tropical medicine and hygiene will find this report worth reading. M. M. LEWIS

Requirements for Biological Substances: 7. Requirements for Poliomyelitis Vaccine (Oral), Report of a Study Group. World Health Organization Technical Report Series No. 237, 1962. Pp. 29 Available H.M.S.O. 1s. 9d.

Over the past four years a number of W.H.O. study groups have met to consider requirements for biological substances that could be recommended for international adoption. Recommended requirements for inactivated poliomyelitis vaccine were published three years ago, but since that time live poliomyelitis vaccine, administered by mouth, has come into use for mass immunization programmes in many countries. It has therefore become necessary to formulate requirements for the oral vaccine. The recommendations of the present report are restricted to the preparation of oral poliomyelitis vaccine in monkey kidney tissue cultures, since so far only vaccines prepared by this method have been extensively used in man. In drafting the requirements the Study Group took into consideration the regulations and requirements already proposed by a number of national authorities as well as data submitted by experts in the field, including the authors of three oral vaccines which have been tested in large-scale immunization campaigns in man. M. M. LEWIS

The Teaching of Genetics in the Undergraduate Medical Curriculum and in Post-Graduate Training. First Report of the Expert Committee on Human Genetics. World Health Organization Techni-

cal Report Series No. 238, 1962. Pp. 19. Available H.M.S.O. 1s. 9d.

Genetics is often regarded by medical students and by many doctors as a difficult and uninteresting subject with little application to clinical medicine. This report seeks to dispel these beliefs, and points the paradoxical situation that now exists that, whereas the teaching of genetics in most medical schools is inadequate or non-existent, there is an increasing demand upon geneticists to give medical practitioners and research workers lectures in genetics and for collaboration in solving problems The introductory paragraphs of the report give reasons for the rapid expansion of genetics as a medical discipline and an excellent bird's-eye view of the present status and application of genetics in clinical practice. This account should surely encourage the reader to delve more deeply into the subjects mentioned. The second part of the report gives detailed suggestions for undergraduate training in genetics and also deals with the requirements of all post-graduate levels, from that required for the various medical and surgical specialities to the training of teachers in medical genetics. It is to be hoped that these recommendations will be universally implemented by all medical schools.

J. BARNES

Arterial Hypertension and Ischæmic Heart Disease (Preventive Aspects). Report of an Expert Committee. World Health Organization Technical Report Series No. 231, 1962. Pp. 28. Available H.M.S.O. 1s. 9d.

This publication indicates the present trend to apply epidemiological and preventive techniques to the control of non-communicable disease, and not to merely restrict their use to infectious disease. Arterial hypertension and ischæmic heart disease are very apt subjects for such a survey since the are major contributors to present day morbidity and mortality. The two diseases are each dealt with separately in the report. The Committee clearly defines terminology and diagnostic criteria for each condition, classifies essential hypertension into three stages and sub-divides ischæmic heart disease into different types. Because of the present lack of knowledge regarding ætiological factors, it is impossible to specify preventive measures which will reduce the occurrence of these conditions. nevertheless much can be done to delay or prevent the progress and complications of these diseases The measures recommended are well chosen and carefully avoid the more controversial aspects Suggestions are given regarding possible future fields of research which would extend knowledge of the natural history and ætiology of these diseases. In addition, there are useful annexures dealing with the renal investigations of arterial hypertension and the different diagnosis of renal and arterial hypertension. This report will be of great interest and value to workers both in clinical and preventive medicine. J. BARNES

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A Textbook of Psychosexual Disorders. CLIFFORD ALLEN. London: Oxford University Press, 1962. Pp. xii + 408. 42s.

This elegantly produced and easily readable book, marred by a few unexpected misprints, is claimed by its author to be the first textbook of psychosexual diseases in any language, and is a development of his earlier work, The Sexual Perversions and Abnormalities, first published in 1940. In an informative scientific manner devoid of sensationalism he succeeds in giving an interesting and clear interpretation of the social significance and possible modes of origin of the disorders of sexual instinct, stimulus and expression in men and women. From long experience in a controversial field he has formulated strong and individualistic views, of which a few, particularly those relating to homosexuality, do not find universal acceptance. Now that he has tempered his earlier over-optimistic claims for the treatment of homosexuality it is considered that the chapters on therapy and prognosis are of unquestionable value and assistance. On the fringes of every military community there is a vaguely comprehended shadowy world of sexual deviation and malfunction. For the medical officer who is occasionally obliged to deal with some of its problems this book is highly recommended.

The Diagnosis and Treatment of Acute Poisoning. J. D. P. GRAHAM. London: Oxford University Press, 1962. Pp. 438. 45s.

The Central Health Services Council have recommended that casualty departments should have adequate reference books on poisoning, and the Minister has asked hospitals to obtain them. The plural is important for there is no one book that will meet all the needs of the casualty officer; general principles, accounts of specific poisons with a comprehensible guide to such problems as the acid-base changes in aspirin poisoning, and aid to identification of vegetable poisons, drugs and cleaning fluids. This book sails between the Scylla of a solely holistic discussion of general principles and the Charybdis of a list of poisons. The casualty officer also needs coloured illustrations of berries and D. HAMILTON of capsules.

Pye's Surgical Handicraft. 18th Edition, Vol. 1. Edited by Hamilton Bailey. Bristol: John Wright & Son, 1962. Pp. 504. Illustrated. 40s.

The new edition of this classical work continues worthily the high standard and practical value which has made it a sine qua non for house surgeons. In a small space are packed innumerable valuable practical tips on every facet of the surgical resident's work, so that Pye is as indispensable to the sugical dresser or junior house officer as a nautical almanack to the navigator. Omissions are few and trivial, but inevitably in a work so extensive and with so many contributors, there is occasional repetition and sometimes the stress is inconsistent. The references are incomplete and perhaps could have been omitted altogether in a work of this sort, as could some of the abbreviated physiological explanations, such as the information that the kidney has 1,000,000 glomeruli! (sic). Naturally, with so much didactic advice, the reviewer sometimes disagrees, for example with the use of relaxing incisions to enable primary suture to be achieved after debridement (p. 179), or the use of local sulphonamides in gas gangrene (p. 126) especially as it is pointed out correctly on (p. 137) that pus inactivates these drugs. Mouth-to-mouth artificial respiration is given prominence, but Schafer's should be allowed to fall into obscurity, and the curt dismissal of intermittent catheterization (p. 344) should be anowed to rain into obsculiny, and the current same intermitted cartiet relation (p. 344) is somewhat cavalier. There are not a few inconsistencies such as (p. 378) "cortisone cannot be given intravenously" and (p. 392) "cortisone intravenously proves most effective." Style varies from the colloquial to the lyrical. Perhaps one should not cavil at words like 'ultraserious' or 'ideality,' or the use of 'K' for potassium, and 'hyperpotassæmia 'for hyperkalæmia, but 'gravitate' as a transitive verb when pour would do is unnecessary. In some ways, this book reminds one of a valued recipe book which includes almost every recipe, but spends seven lines on how to boil an egg and three on how to make a soufflé. Nevertheless it is all in the 'Pye' and that's what matters.

J. C. WATTS

Medical Precepts in Tropical Africa. MICHAEL GELFAND. Edinburgh and London: E. & S. Livingstore, 1962. Pp. 16. 2s.

This opuscule consists of 144 maxims based on Central African medical practice. Some are selfevident—"In the tropics not every fever is malarial," some for the beginner—" any lesion at the base of the right lung may be amæbic," some alembicated "If the African has an abnormally dark face, test the urine for sugar as well as porphyrins" (hæmosiderosis I would surmise). Booklets of this size, like reprints of lectures, are not to everyone's taste, nor are aphorisms. For "in all pointed sentences some degree of accuracy must be sacrificed to conciseness" (Johnson), and no doubt "the wise make proverbs and fools repeat them" (Isaac D'Israeli), and of course "a man of fashion never uses aphorisms" (Chesterfield). I enjoyed this booklet and recommend it for coffeebreak perusal. I cannot think why financial backing had to be found, when so few pages sell for two shillings. Mercifully it is printed on matt paper rather than the shiny and smelly paper so often University presses are one of the very essentials of civilization, and it is time we saw more (perhaps I should say some) in Equatorial Africa. D. HAMILTON In

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